

THE IRON AGE

THURSDAY, MAY 10, 1888.

The Ide Horse-Power Indicator.

We take pleasure in presenting in this issue engravings of an ingenious device recently designed and constructed by Messrs. A. L. Ide & Son, of Springfield, Ill. The apparatus is in effect a horse-power indicator for automatic steam engines and is very simple in operation.

Fig. 1 on this page shows an elevation, and Figs. 2 and 3 vertical sections of the device, while Figs. 4 and 5 illustrate its

weight of the rack thereby aids a spring in giving the backward movement to the index-hand. The rod L is constructed to slide freely through the standard connecting the case H with the case G, and the upper end of the rod presses against the lower end of the segmental rack N, so that when the rod is lifted the rack will be thrust upwardly and the index-hand thereby turned to carry it away from the zero-point. It follows from this construction that any upward movement of

and the weight of the segment N takes place only as fast as permitted by the escape of the fluid upwardly past the pistons. It follows from this construction that the rod L will be free to quickly rise when struck by the arm f of the rock-shaft F, but will descend very slowly, so that its motion between any two reciprocations of the valve will be slight, and when the valve moves continuously with the same throw the index-hand will remain practically stationary. As soon, how-

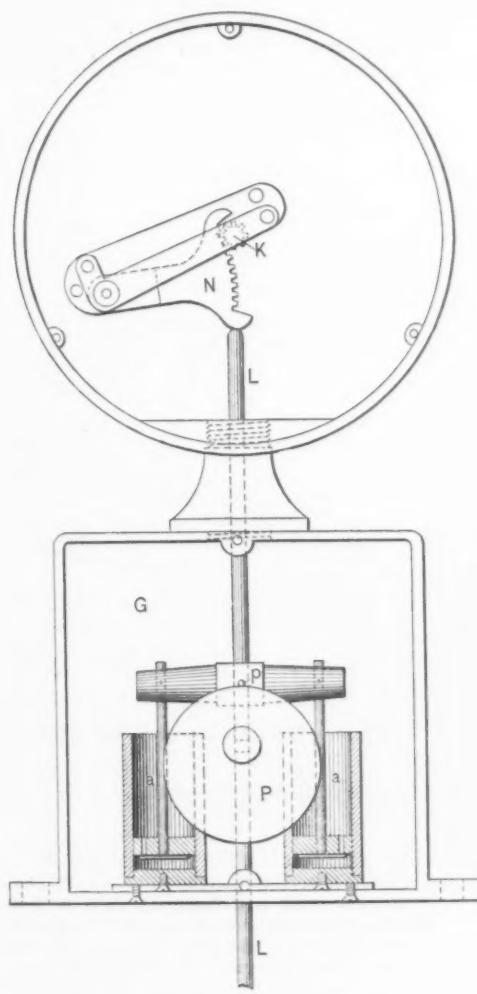


Fig. 2.—Vertical Longitudinal Section.

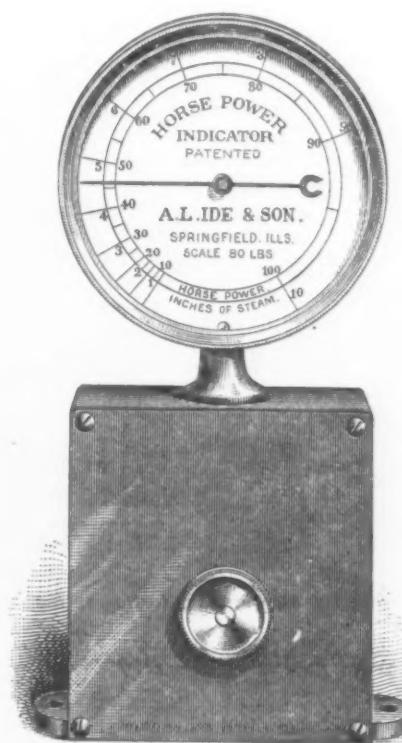


Fig. 1.—General View of Indicator.

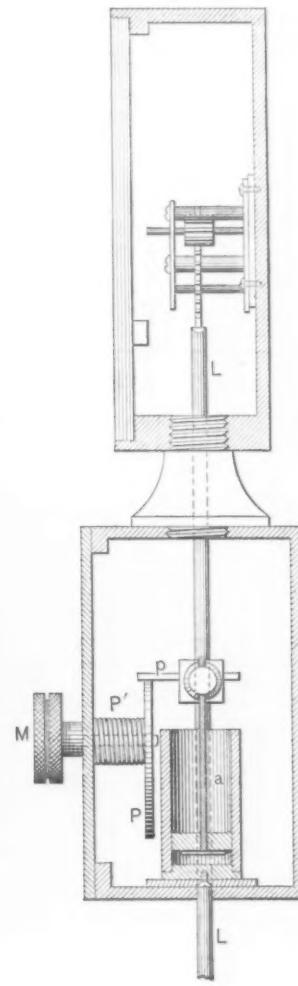


Fig. 3.—Vertical Cross Section.

HORSE-POWER INDICATOR, MADE BY MESSRS. A. L. IDE & SON, SPRINGFIELD, ILL.

method of application to an engine cylinder. It consists essentially of a casing, G, containing some of the operative parts of the indicator, and a second casing, H, mounted upon it and provided with a dial-plate, over which moves an index-hand. By means of a vertical rod, L, motion is transmitted from the rock-shaft F (Fig. 4) to the indicator. The rod L engages at its lower end a horizontal arm, f, attached to the rock-shaft F. As this rock-shaft is oscillated in the vibratory motion of the engine-valve, the rod L is lifted by the action of the arm f and the motion is communicated to the index pinion K by means of a toothed segment, N, as shown in Figs. 2 and 3. This segmental rack is so arranged that when the arm L is at the lower limit of its movement the index-hand will be at the zero-point. The

rod L will be immediately transmitted to the index-hand and will move the latter to an extent depending upon the degree of upward movement of the rod.

In order to prevent the falling of the rod L by gravity in the descent of the segment N two dash pots, a a, are arranged within the case G. The connection of the rod L with the dash-pot piston is clearly shown in Figs. 2 and 3, a cross-bar being used for the purpose. The dash-pot pistons are provided with apertures covered by downwardly opening flaps, and the cylinders themselves contain glycerine. When the rod L is thrust upwardly the pistons freely rise in the cylinders. They are fitted somewhat loosely in the cylinders, so as to allow a small escape of fluid past the pistons, and the descent of the rod under its own weight and the action of a spring

ever, as the throw of the valve is lessened or increased the index-hands and rod L will fall or rise to correspond with the extent of the change in the throw of the valve.

In order to enable the indicating device to be thrown out of action when desired, the rod L is provided within the case G with a horizontal pin, p, adapted to engage the upper surface of an eccentric, P, attached to a shaft, P', Fig. 3, which is mounted in the wall of the casing and provided outside with a milled head, M, which may be turned for rotating the eccentric P, and thereby lifting the rod L to a point where it is free from contact with the moving part connected with the valve. A spiral spring is shown as placed about the shaft P' between the wall of the casing G and the adjacent face of the

eccentric P. This spring is for the purpose of holding the eccentric at the point to which it is turned.

In graduating the dials of these indicators where but one line of graduating is given, the area and speed of piston and steam pressure are to be considered, and the makers' method of graduating the indicators is to attach them to the engine on which they are intended to remain, adjust the governor to drive the engine at the desired speed, supply steam pressure at, say, 80 pounds, or the pressure that it is intended to carry, and place a paper dial on the indicator; start the engine without load and mark the location where the pointer hands remain without load. This is the zero mark. Then apply a brake or load on the engine wheel of, say, 10 horsepower. Take an indicator card with this load on and mark on the paper dial the position of the hand while this load of 10 horsepower is on, and number the mark on dial, say, No. 1; then number the indicator card taken No. 1. Next apply a

graduated, as shown, which gives inches of steam taken during each stroke—or, in other words the point of cut-off. From this graduation, the amount of power developed by the engine can be readily ascertained at any time—that is, at any speed or at any steam pressure with this outer graduation showing point of cut-off it is only necessary to note the steam pressure and count the revolutions of the engine, then it is a simple matter to figure the power which the engine is developing, thus giving the engineer all the advantage which he could obtain by the use of an indicator so far as regards ascertaining the amount of power being used. By means of the milled head M, to which we have already referred, it is obvious that the index may be carried to any desired position. If turned to point to, say, 50 horsepower, the indicator will be inoperative until such times as the load is increased beyond that power, then the hand will begin to register and can be arranged with electrical connection so that it will ring an

of some small cracks which appeared to stop short at the weld no damage was done.

A New Dynamite Gun.

According to the *Army and Navy Register*, the Ordnance Department of the Army has received from Mr. Maxim, of England, the description of a new dynamite gun which he has projected, in which he proposes to introduce a new and interesting method of expelling the projectiles from the weapon, and by which he hopes to render the use of dynamite in projectiles practicable in heavy guns. He retains the pneumatic principle which has been utilized with so much success by Captain Zalinski, but instead of using compressed air alone, as Captain Zalinski has done, he mixes with this compressed air a quantity of volatile hydrocarbon, such as the vapor of gasoline. This compressed mixture is introduced behind the projectile and the pressure is applied to start it forward in

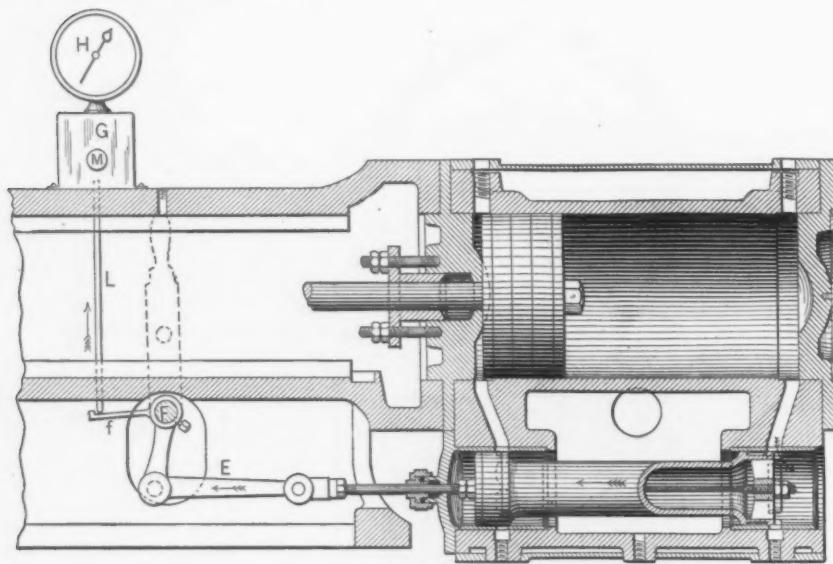


Fig. 4.—Longitudinal Section of Cylinder, Showing Application of Indicator.

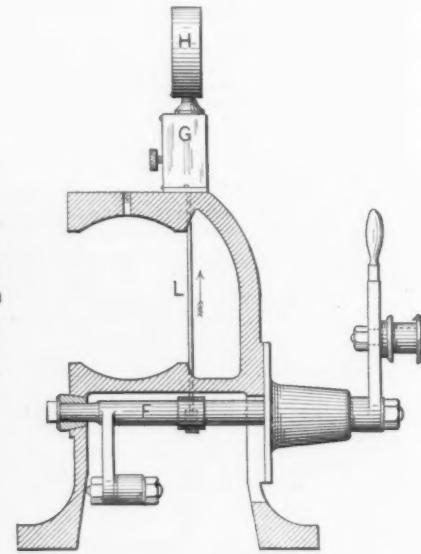


Fig. 5.—Cross Section and End View.

HORSE-POWER INDICATOR, MADE BY MESSRS. A. L. IDE & SON, SPRINGFIELD, ILL.

load, say, of 20 horsepower, take an indicator card while this load is on, mark the position of the indicator hand on the dial and number this mark and this card No. 2, and proceed in the same manner, marking the position of the hand and card with each increasing of load until the full load is on, causing the valve to take its full travel. Then the power, as shown by the indicator cards taken, is figured, deducting the friction of the engine. This enables the makers to graduate the dial, showing the exact power as expressed by indicator cards, or the dial can be graduated in like manner from the power shown as indicated by the brake. In either case the dial will express net horse-power developed by the engine. When the paper dial is figured out complete a copy in metal is made similar to the ordinary steam gauge for the permanent dial for the indicator. It will be noticed that on the dial, in Fig. 1, is stamped a scale of 80 pounds. This means the steam pressure to which the indicator dial is graduated and in addition to this they usually place just below that the number of revolutions at which engine was running when the dial was graduated.

When desirable, two or three lines of graduation can be placed on the dial, marking each one, say, one at 100 pounds, one at 80 pounds and one at 60. In this case, each circle will show the number of horsepower. An outer line is also sometimes

alarm bell whenever the load on the engine increases above the point to which the indicator may be set.

The first of a series of tests as to the comparative advantages of compound and solid steel armor recently took place on board the British warship *Nettle*. The plates sent in for competition are all the production of English makers and are of a uniform thickness of $10\frac{1}{2}$ inches, and measure 8×6 feet. The first one tested was a compound armor plate manufactured according to Wilson's patent by Messrs. C. Cammell & Co., of Sheffield, which was secured to backing 4 feet 6 inches in breadth by eight bolts. Two rounds were first fired at it with Palliser chilled projectiles from a gun having, under the conditions of the experiment, an estimated penetration of 12.5 inches of iron armor. These shots did no appreciable damage, but splashed against the face of the plate like so many leaden balls. Two of Holtzner's projectiles were next fired, which embedded themselves in the plate to a depth of 5 inches and there remained. A third steel projectile was then fired, which after penetrating the plate to about the same depth fell back upon the deck in a shapeless condition. This concluded the test. The target looked as if pitted with the small-pox, but with the exception

the chamber of the gun. After it has moved a certain distance the projectile itself uncovers a detonating fuse and an explosion then occurs, the air furnishing the oxygen for the explosion and the pressure being increased about eight times. He claims that by this method his initial pressure does not need to be more than half as great as that used by Captain Zalinski. He does not have to use so much compressed air, nor does he require that the barrel of his gun shall be of such great length. His highest pressure is about 4000 pounds to the inch, the first pressure being not more than one-tenth of that. His detonator is a very ingenious affair, and is inserted through a small circular opening from the interior of the gun.

A potential danger of flat wheels not generally recognized was recently pointed out by Mr. C. A. Gilchrist, superintendent of the Fort Madison and Northwestern. He said that in testing a bridge in the usual way with a heavy locomotive nothing unusual was shown, the deflection of the structure having been only $\frac{1}{4}$ inch. But in the train hauled by the locomotive there was a flat wheel, and when it struck the bridge it caused a deflection of $1\frac{1}{2}$ inches. The difference was so striking that it would be interesting and important for some road to investigate the extent of deflection due to flat wheels.

A Foundry Cupola Experience.

At the meeting of the American Society of Mechanical Engineers, held at Nashville, Tenn., this week, Mr. F. A. Scheffler presented a paper giving the results of an interesting foundry cupola experience.

It appears that recently one of the large manufacturing firms in the western part of Pennsylvania outgrew the capacity "output" of their foundry cupola. The capacity of the old cupola was forced to 34,000 pounds per day, and it required the blower to be in operation from 3 p. m. until the final charge was withdrawn, which occurred about 5.30 p. m. The cupola was then so hot that in the morning it was quite unfit for the cupola tender to make ready for the daily "heat," although the work had to be done, but it was undoubtedly not very invigorating to the tender. The size of the cupola was 60 inches outside diameter and 44 inches in

would increase the output about 20 per cent. in the same length of time, and shorten the time required for a "heat" of the ordinary size. The dimensions and style agreed upon called for a 72-inch shell, which, when lined up with 8 inches of fire-brick, would make 56 inches inside diameter. The height was 15 feet from spout to charging door, and this space would contain 10 tons, not including fuel. The tuyeres were eight in number, and all located on the same horizontal plane, being in shape the form of an equilateral triangle, each side being 6 inches long. They were placed at a height of 24 inches from the base plate, and were surrounded by a blast box 12 inches square. The new cupola was to be erected in close proximity to the old one, and it was desired to utilize the same connecting blast-pipe for both cupolas. The question of size of blower required to give the proper blast for the new cupola was a serious one, for

new cupola tuyeres and blast box and that of the old one, that if there was anything wrong with the latter it would be shown by the difference in the working qualities of the same and the new cupola. The branches of the Y connections were 12 inches in diameter. The general arrangement of cupolas and connections is shown in the engraving. It will be noticed that either cupola can be run independently of the other, and all connections are so arranged that it was not necessary to shut down a day to make the new connection.

The first heat taken from the new cupola was very successful. The succeeding ones were still better, and not only were they "run off" quicker and better than any of those taken from the old one, but the blast was so great that the water in the gauge, which was only intended to register up to ten ounces of blast, was blown out of the top of the same, and when the new one was made the pressure was found to be between 11 and 12 ounces. No change of speed of blower had been made and the same main blast-pipe was utilized. The "heats" were taken off with the blast-gate only one-quarter open, whereas with the old cupola this gate was required to be wide open almost continually throughout the heat. Great satisfaction was the result, as the price of the new blower had been saved, as well as the expense which would necessarily have been involved in putting down a larger main-blast pipe and a possible loss of two days' castings.

As will be noticed, the trouble was with the blast-box on the old cupola and the tuyeres in the same, and not with the fan. The tuyeres were five in number in each row (there being two, an upper and lower row) and were too small in size to admit the amount of blast which the fan was capable of developing, consequently the latter was "choked." It is simply impossible to get the full benefit from a fan unless it has practically no outward friction to the passage of the greatest blast which it is capable of producing, or at least unless this friction has been largely reduced. The facts or lessons which are presented by the above experience are, according to Mr. Scheffler: That by using a small amount of practical common sense a fan which had been pretty well "rattled" was made to bring out that which it had long been striving to do by making the final exit passages (tuyeres) of a combined area greater than the area of the pipe at the outlet of the fan, and by reducing the blast-box to a size which would be no larger than actually required, this being in cross-section about 10 per cent. more than the area of the fan outlet. When forcing air into the new cupola under the above circumstances the fan does not require as much power to drive it, and in the same time more iron can be melted with it than it was possible to melt in the old cupola. The latter melted at the rate of eight tons per hour; the new one at the rate of ten tons.

PLAN OF CUPOLAS AND CONNECTIONS.

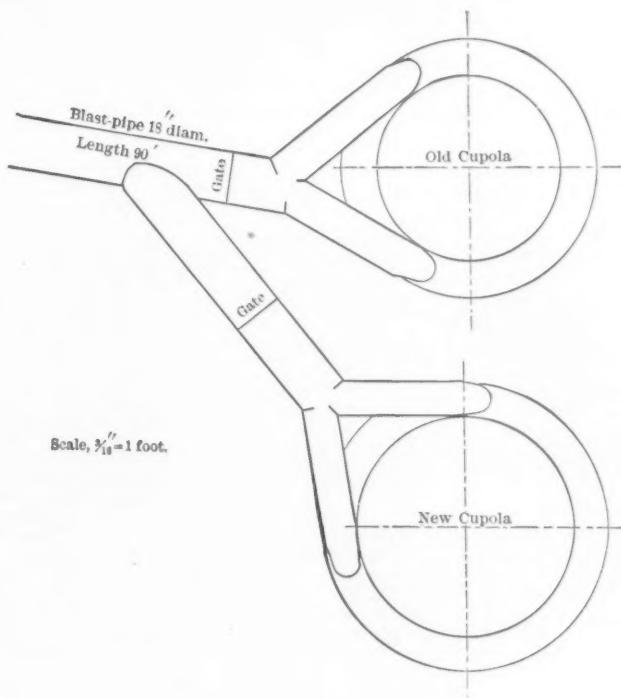
side, the fire-brick lining being 8 inches. The distance from the bottom or outlet spout to the charging door was between 13 and 14 feet. There were two rows or sets of tuyeres, one above the other, being virtually a well-known Detroit cupola. The greatest amount of blast obtainable was 9 ounces, and the blast gate was wide open almost continually throughout the heat, notwithstanding the fact that the blower (Sturtevant's make No. 8) was speeded 100 revolutions faster than the list called for to produce a 12-ounce blast. The difficulty was, of course, shouldered upon the blower and the catalogue list of the makers, but, as will appear, the entire fault lay with the tuyeres and blast box on the cupola. The fan was situated 90 feet from the cupola, and was connected by an 18-inch galvanized iron blast-pipe, which was straight with the exception of the elbow where it left the fan and the Y-shaped connection into the cupola, the two arms of the Y forming at the same time vertical elbows each 10 inches in diameter. Thus the connections between the fan and cupola were such as to produce the best possible results, especially as the outlet from the fan was only 13 inches.

The capacity of the new cupola was desired to be 10 or 12 tons per hour, which

it was fully believed that the one already in use could not possibly supply the amount required, when it was so evident that it was doing all that could possibly be obtained from it. Bids were therefore asked for a fan which would be guaranteed to melt 12 tons of iron per hour in a cupola 56 inches inside diameter. These were the only data given upon which the bidders were to base their estimates. The bids were all about the same in regard to size of fan required to produce the work and necessary (12 ounces) blast. One well-known firm advised a fan so close in size to the one already in use, that the surprise was very great, as both fans were similar in construction. So positive was the bidder that the fan mentioned would do the work that it was not deemed advisable to purchase a fan of the same size as the old one, for it was considered that two fans of the same size and general construction ought to do the same work under the same conditions. Hence the suggestion arose that there must be something radically wrong with either the fan, or both the blast box around the old cupola and the tuyeres in the same, and it was determined to discover, if possible, where this defect lay, by simply connecting the 18-inch blast-pipe into the new cupola. So vastly different was the construction of the

The Novelty Aerial Ship Company was organized in Jersey City lately. The capital stock is said to be \$1,000,000, and the business of the company to manufacture and operate ships to travel through the air.

The railroad question in Iowa has taken a new form. It will be remembered that after the Interstate Commerce act went into effect last year the manufacturers and jobbers located at interior towns in the State found themselves at a disadvantage in distributing goods at points further West in competition with establishments at Chicago or other trade centers East of Iowa. The trouble lay in the fact that the freight from the outside establishments to the final purchasers was lower than the rate from Eastern sources of supply to the



Iowa manufacturers or jobbers plus the rate thence to the final purchasers. The Interstate Commission having refused to interfere in their behalf, the Iowa business men appealed to their legislature for relief, and an act was accordingly passed to meet the case. As is usual with such legislation there is some doubt as to what is meant by some of the provisions of the act, and on the 2d inst. the Iowa Association of Freight Agents held session with the Board of Railway Commissioners to arrive at an understanding as to its effect upon the various freight lines. The railroad men desired some definite authority from the Board on which to base their action in the interim between the taking effect of the law and the publication of the schedule to be made by the commissioners. They were assured that they must look to the law itself for their authority and guide, taking their chances as to the fulfillment of its terms. The conclusion reached by the railroad men was that they will at once make a distance tariff for the State to hold until the promulgation of the official schedule. In discussing the law it seemed to be agreed that it effectually destroys all competitive rates, placing all points upon a basis of substantial equality, except as modified by distance. If this is the correct interpretation of the law, it is likely to meet with as much disfavor as the former condition of railroad matters.

Keep's Tests for Foundry Iron.*—I.

All who have had to do with the testing of cast iron are aware of the fact that hitherto there has been no uniform and recognized system of tests applied in order to determine the mechanical characters of the material. Not merely do the tests applied in different countries vary considerably, but the methods used by the scientific experimenter are often widely different in character from those adopted by practical men, and even in the same locality founders and engineers differ considerably in regard to the tests they require for irons to be used for the same purpose. The present paper is written to introduce to the attention of ironfounders and engineers in England an attempt to find a common language to be applied in speaking of foundry iron. The apparatus and methods to be described are intended to be as simple in construction and operation as possible so as to meet the requirements of the practical founder, and at the same time to be of such accuracy as to meet all the ordinary requirements of scientific research. It may be mentioned at the outset that the tests recommended are the result of many years' experience in working with various classes of iron from widely different localities, and that they have been successfully adopted without any important alteration for upward of two years at the works of the Michigan Stove Company, at Detroit, Mich., U. S. A., of which company Mr. Keep is superintendent, where upward of 70 tons of pig iron are daily manufactured into thin castings. "Keep's Tests" have also been adopted by a number of important American firms in this line.

Remelting.—It is desirable to have at least 50 pounds of the iron which is to be tested. It is possible to perform the tests with 15 or even as little as 10 pounds of metal, but it is desirable to retain sufficient for two further meltings in case a duplicate test is required at any time. The 15 pounds of metal is melted in a plumbago crucible of suitable size, and of such a kind as is commonly used by brass founders. The bottom of an old crucible may be used to cover the pot during melting. The

furnace employed by Mr. Keep is shown in Figs. 1 to 4, and will need little more explanation than is attached to the drawings. This furnace is of fire-brick, coke is used for fuel, while the furnace is driven by a fan producing a pressure of blast of $2\frac{1}{2}$ ounces per square inch. The iron will be melted in about 35 minutes, and will be changed slightly, if at all, from the original composition. It is important to remember that the object of the tests to be described is primarily to determine the characters of the pig iron, and hence it is necessary that the change produced by melting should be as small as possible. Melting in a cupola, or even in an air furnace, would, of course, produce considerably more change. The furnace may be partly above the floor, or wholly beneath it, as found most convenient. The ash-pit must be air-tight, and the furnace itself must be tight so as to exclude air, and prevent flame blowing through the cracks. The most refractory material must be used for lining, and ground crucibles, with just enough fire-clay wash to bind it, is best for repairing.

Before describing the tests in detail, we show a chart illustrating the results obtained with a particular sample:

the broken bars are used for observing the depth of the chill and the character of the grain, both of which are recorded for reference. The depth of chill is determined by splitting off the end of a square bar longitudinally by means of a cold chisel, and measuring the depth of the chilled metal. The grain of the fracture of the bar is observed by means of a pair of lenses, each of $1\frac{1}{4}$ inches diameter and 1 inch focal distance. The focal length together is $\frac{1}{2}$ inch, and with a little practice this gives a clear view. In addition to the bars above mentioned two other test-pieces are made. The first is called a fluid strip, and is intended to indicate the relative fluidity of the molten metal. The pattern for this is 1 inch wide, 12 inches long and $\frac{1}{16}$ inch in thickness. This is run from the end and is poured first. This strip rarely runs full, and the length of the strip in inches is taken as a measure of the fluidity of the metal. It is, of course, necessary for this test that the metal should always be poured at about the same temperature, and with a careful workman the test gives fairly uniform results with given brands of iron. The second of these test-pieces is called the crook strip; this is 12 inches long, 1 inch wide and $\frac{1}{16}$ inch in

No. 176 Poughkeepsie No. 1.							TRANSVERSE STRENGTH. The Av. Def. Exc.	WEIGHT.	REMARKS.
No. Set.	Size. h. b.	SHRINKAGE.			COLD	HOT			
		COLD	HOT	COLD		IMPACT.	IMP. WT.	IMP. WT.	
1	498 496	134	133 ²	150	148 ²	350 25	0	Fluid Strip. Over gray part lead color. On edge of gray very yellow as chill whitens yellow turns to white. On other side the edge of gray is crimson brown, thin gold, then blue & gold, then green. Edge is purple fracture shows that chill hangs on edge at 5 in. all chilled at 10 inches.	CROOK Strip. very slight chill at the edge of the cold end. Then very no chill at all on the edges. A little blue stain near gates.
2	499 491	135	135	149	146	350 25	0		
3	497 493	133	133 ²	146	143	365 24	0	Cross Fracture. Very long mottled, dark streaks.	Longitudinal fracture has fine mottle & very distinctly marked, the white mottling complete. Round black grains run into the chill. The chill is white & smooth. Chemical analysis of another pig from the same stock pile gave P. 1.242, S. trace 51. 2946. M.R.A. 179. G.C. 2.079 C. 0.464.
4	495 496	134	134	150	148 ²	322	0		
5	495 494	135	135 ²	149	146 ²	339	0	Cross Fracture. Very long mottled, dark streaks.	Cross Fracture. Very long mottled, dark streaks.
6	500 492	137	137	148	145	329	0		
AVERAGES	497 493	134	134 ²	148 ²	146 ²	355 25	0	Cross Fracture. Very long mottled, dark streaks.	Cross Fracture. Very long mottled, dark streaks.
IMP. WT.	497 494					333	0		

Test Bars.—These consist, in the first place, of two bars, one exactly $\frac{1}{2}$ inch in square section, cast with the ends against a chill exactly $12\frac{1}{2}$ inches apart (see Fig. 5); the other bar is cast with this, and is run from the same gate; it is 1 inch wide and $\frac{1}{16}$ inch thick, and is run against chills in the same way as the square bar. Six of these pairs of bars constitute a test, and each bar bears the number of the chill against which it was cast. When the bars are trimmed, and both bars and chills have attained the same temperature, the shrinkage of both thin and square bars is measured to $\frac{1}{1000}$ inch by inserting a graduated wedge (Figs. 11 to 18) between the end of each and its chill. The mean between the shrink measured on the two ends constitutes the shrinkage. The transverse strength and resistance to impact are measured as afterward described. It may be mentioned, however, that the transverse strength is obtained by breaking square bars 1, 2 and 3 by means of a gradually applied weight, the deflection being measured at the same time. Bars 4, 5 and 6 are then broken to obtain resistance to impact by a series of blows from a 25-pound weight, the first blow being with a $\frac{1}{2}$ -inch fall, and the fall increases by $\frac{1}{2}$ inch each time. An arbitrary scale has been constructed, giving a value in pounds avoirdupois on an assumed value for a foot-pound. This has been done in order to allow for comparison between the effects of a weight gradually and suddenly applied. After these have been determined

thickness. On the center of one side there is a rib $\frac{1}{16}$ inch high; this is $\frac{1}{2}$ inch wide at the base and $\frac{1}{16}$ inch wide at the top. The unequal shrinkage of the thin, flat strip, and of the taper rib, causes a slight curve in the test-piece. This, when measured, affords valuable information as to the properties of the iron, and is called the "crook."

Patterns.—These are fully shown in Figs. 5 to 15, and need no detailed explanation. The follow-board is of iron, and everything is made with the idea of durability, and no appreciable wear should take place. No change should be made in the patterns after beginning to use them, as a change might alter some important condition.

Molding.—This is done with such sand as is used for light castings, and which has been used before, but to which no facing has been added, neither should facing be used in preparing the castings. Enough sand must be tempered over night to do the work of the day without using any sand over again. The flasks used are of iron, very carefully fitted, the inside measure is $14\frac{1}{2}$ inches by $7\frac{1}{2}$ inches, the nowel is 1 inch, and the cope $1\frac{1}{2}$ inches deep. An iron weight is used on the top instead of clamps. No rapping is done to cause the pattern to leave the sand, and the casting must be like the pattern. The iron is poured from the crucible as soon as it is skimmed; the first flask contains the fluid and crook strips, which are poured before any other. The remaining six

* A paper read before the South Staffordshire Institute of Iron and Steel Works' Managers by W. J. Keep, C.E., Detroit, Mich., U.S.A. Revised and communicated by Thomas Turner, Assoc. R.S.M., Mason College, Birmingham.

flasks are poured in order of their numbers.

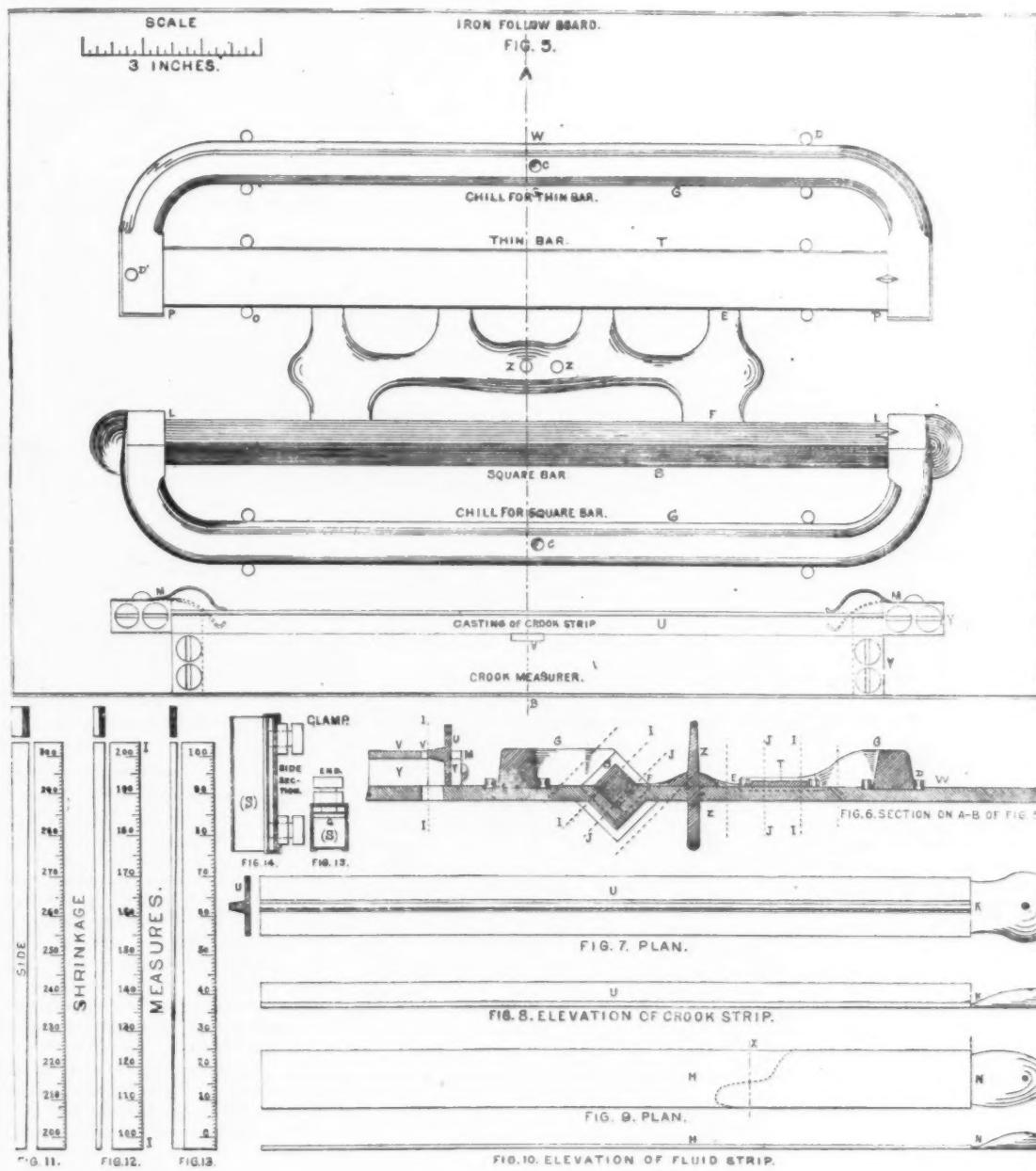
Measuring Table.—The measuring table is mounted on a box or table, so as to be of a convenient height, and is an exact duplicate of the follow-board (Figs. 5 and 6). On the front of this iron table (Fig. 5) is the measure for crook strip. The strip is slipped behind the springs M, with the nose of its rib against the straight edge V. The measuring wedge (Figs. 11, 12 and 13) is then slid down the slot (V) in the straight-edge. This

the sides of the thin bar; these are necessary on the measuring table, but are not required on the follow-board used in molding, as the steady pins (Z and Z') on the gate hold the pattern in the same position as the pins hold the loose bars. Openings are made through the iron table, between the ends of the bars and the inside of the chills (see dotted lines I I', J J', &c.), so as to allow a measuring wedge to be inserted. The actual measurement is conducted as follows: A chill bearing a certain number is laid in position on the

in the same way. One of the thin bars should be broken in order to record the appearance of the grain to the naked eye.

We will describe in our next issue the details of the two machines adopted for testing the strength of the square bars.

According to experiments mentioned in *Indian Engineering*, the tensile strength of a wet rope is only one-third that of the same rope when dry, and a rope saturated with grease or soap is weaker still, as the lubricant permits the fibers to slip with



Figs. 5 to 15.

KEEP'S TEST BARS AND MEASURING APPARATUS.

slot is exactly $\frac{1}{1000}$ inch deep, so that the 100ths wedge (Fig. 12) may be used, and the record, which is the correct crook of the strip, is of course $\frac{1}{1000}$ less than the reading on the wedge. This allows the small wedge (Fig. 13) to be dispensed with, as the shrinkage of iron never runs so low as 100, and is rarely higher than 250. It is well to break the ends of the crook strip and record the appearance of the grain.

To measure the shrinkage of the square and thin bars, the iron table has steady pins so arranged that the chills and the bars will lie exactly as they did in the mold. In Fig. 5 steady pins are shown on

table, and the castings are selected (both square and thin bars) which bear the same number as the chill. The right-hand end of the square bar is pressed against its chill, the wedge is then slid between the left chill and the end of the bar, and the reading taken. The operation is repeated at the other end, and the mean of the values obtained is recorded as the shrink. The bars and chills are marked on their ends to show how they lay in the mold, and the experiment is performed first with the upper corner, which is called the cold edge, and is afterward repeated with the hot edge of the square bar. The hot and cold edges of the thin bar are then treated

greater facility. Hemp rope contracts considerably on being wet, and a dry rope 25 feet long will shorten to 24 feet on being wetted.

The annual review of the New York Chamber of Commerce, just issued, dwells upon the "imperial future" of the city, and calls attention to the fact that, vast as the schemes of the city improvement may be, these can hardly keep pace with the march of population. In 1880 the population of New York and its immediate environs was 2,013,908 (New York City, 1,206,577). To-day, 1888, that of New York and its environs is estimated at

2,584,766 (New York City, 1,528,452). In the year 1900, at the same rate of progression, the city alone will contain over 2,000,000 of inhabitants, and the population which depends upon it as a center nearly 4,000,000.

Cleaning Metal and Stonework.

During the year 1886 the masonry and ironwork of the Madrid and Baudin bridges at Paris were thoroughly cleansed by Messrs. Mathieu and Peigné, who work the patent processes of M. Liebhaber. These processes, which are purely chemical in their nature, were at first applied solely to the cleaning of limestones, but in these bridges materials of a very different nature were successfully dealt with. The surfaces to be cleansed, as described in *Engineering*, are submitted to the action of a jet of mixed hydrochloric and sulphuric acids, and left for two or three hours, when they are well brushed, and finally washed down with a water jet, which completes the process. In the case of limestone masonry, the hydrochloric acid unites with the calcium, forming chloride of lime, which is then decomposed by the sulphuric acid forming a calcium sulphate, this being precipitated on the face of the stone, and containing all the impurities, which are then removed by the action of the brush and of the water jet. In many cases this acid treatment will not succeed unless the stone is previously prepared, as the masonry frequently becomes coated with a black and shining deposit of all the impurities contained in the atmosphere of a large town, which entirely prevents the acids reaching the stone.

In this case M. de Liebhaber, before applying the acids, covers the stone with an alkaline paste, consisting of a mixture of carbonate of soda and calcium hydrate, which he has named "tolugene." This paste is spread over the face of the masonry with a trowel, to a thickness of from $\frac{1}{2}$ to 1 mm., and left there for from three-quarters of an hour to an hour, when the excess is quickly washed down and brushed off, and the acids applied as previously described. In cleaning ironwork the "tolugene" alone is used; it is spread over the work either with trowel or brush, and in the course of an hour or so will have united with all the oil of the paint, leaving the red-lead on the work in the form of a dry powder, which can be easily washed off with a jet of water. The metal is said to be cleansed much better than by the older method of burning and scraping off the paint. For cleansing brickwork M. Liebhaber makes use of the property which hydrofluoric acid possesses of separating the silica from silicates. The work is first painted with a solution of ammonium fluoride, and this immediately afterward is treated with a jet of concentrated sulphuric acid, which liberates hydrofluoric acid *in situ*, and this immediately attacks the silicates, robbing them of their silica. The whole surface is afterward thoroughly washed with water. With regard to the cost of the processes, a total of 502 square yards of masonry, of which about 165 were sandstone, were treated at the Madrid Bridge at a cost of from 13 to 17 cents per square yard, and brickwork at the Baudin Bridge cost 17 cents per square yard, the prices including the cost of erection of such scaffolding as was necessary. With regard to the ironwork, the contract price was 20 cents per square yard for plain work, and 31 cents per square yard for molded work, but the contractors are said to have lost money in carrying out this part of their contract.

What is said to be the only locomotive engine ever constructed wholly in the South, so far as can be learned, has been built in Anniston, Ala.

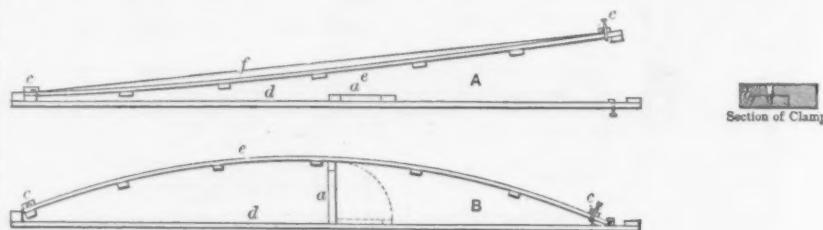
Large Blue Prints.

Within the past year or two we had occasion to describe a method of making blue prints of extraordinary size, ranging up to 8 feet in length and 3 $\frac{1}{2}$ feet in width. They were turned out on a revolving cylinder, contact being secured simply by drawing the tracing tight over the sensitive paper and the underlying felt by means of suitably arranged clamps and springs. No glass was needed, and the expense and risk, and something of the trouble, of the common method of operation was thus avoided. Special interest is therefore attached to a later and simpler apparatus and method devised by Prof. Robert H. Thurston and described by him in a paper presented this week to the American Society of Mechanical Engineers at the Nashville (Tenn.) meeting. The diagram which we annex explains the arrangement in question.

The printing apparatus used consists of nothing but a single thin board of the length and breadth of the proposed print, with some margin for the stretching clamps. This board is covered with good felt of carefully selected quality, securely

and well secured. The board is next laid down on the supporting base, the two ends made fast, the one to the batten at the left, the other to another arranged at the proper distance from the right-hand extremity, the printing board springing into a curve, of which the bridge *a*, hinged at the middle as in *A*, and thrown up as seen in the sketch *B*, gives the versed sine. By springing to any desirable extent as in *A*, and then reversing the curve as in *B*, any required degree of tension and stretch can be given the tracing, and thus any necessary amount of pressure and perfection of contact with the sensitive paper may be obtained. The small cut at the right represents a section of the clamp used.

The scheme will suffice to print any area of blue print that paper can be obtained to cover—a half-mile square if necessary. The amount of springing required is very small, and never enough to affect perceptibly the uniformity of the printing and tone of the print. If it should ever seem too great it is easy to correct the defect by first springing the board in the reverse direction, then, after drawing the covering felt and papers tight, bending it in the first proposed direction, past the straight line, and as far



APPARATUS FOR MAKING LARGE BLUE PRINTS.

and smoothly fastened to the board by any convenient means. A line of tacks around the edges does as well, perhaps, as anything. The sensitive paper is then stretched over the felt, and the tracing drawn over that, and both are smoothly stretched by clamps or other convenient device. It is, of course, evident that it would not be practicable by this operation simply to obtain that complete contact and pressure throughout the surface in contact that is required for good work; but this desideratum is easily secured by the simplest expedient imaginable: The board is merely sprung to a flat arc in the direction either of its length or of its breadth, ordinarily in the longer line. This brings everything "taut," and the printing is done precisely as under glass, with the further decided advantage that no light is lost through the intervention of the glass, which, however excellent in quality, will inevitably absorb a very measurable amount.

The apparatus was designed by Professor Cleaves, of Cornell University. The upper, or printing board, is supported upon a lower and somewhat narrower and longer one, which in turn should be carried on trestles or other convenient arrangement. The printing board is stiffened laterally by strips or battens, but is free to spring longitudinally to any desired extent. The supporting board is stiffened longitudinally. At each end of the latter is a batten, set transversely. Clamps *e e* are placed at either end of the printing board by means of which to secure the felt, paper and tracing. One or both of these clamps may be made adjustable for varying lengths of print. The engravings represent side elevations, and show the method of operation. The board is first raised at one end and thus slightly sprung. The felt and paper and the tracing which forms the negative are stretched smoothly between the clamps

as may be found desirable to secure good contact. This method has been found to work quite as well as the cylinder.

A letter from the city of Mexico, dated 26th ult., says two important railway concessions have been received by English capitalists from that Government. One is for a railway from Esperanza, on the line of Vera Cruz, to a point of the Pacific Ocean, passing through the cities of Pueblo and Oaxaca. The concession involves the expenditure of \$25,000,000 in gold, which is ready in London. The other concession is for a railway across the Isthmus of Tehuantepec, which will cost \$20,000,000. A railway trunk line between Guatemala and city of Mexico is also talked of. It is estimated that within the next few years \$50,000,000 of English money will be invested in Mexico.

On the 24th ult., a large gas well was developed on the Abbott farm, 14 miles south of Wabash, Ind., by the Citizens' Company, of Peru, Ind. The gas will be piped to that place. The flow was very strong at 5 feet in the Trenton rock, which was tapped at a distance of nearly 1000 feet from the surface. The well is perfectly dry. The find practically assures gas in abundance for Wabash, as the syndicate who is to supply that city with gas has several farms leased in the vicinity and will begin drilling there at once.

A very interesting affair was the presentation by the employees of Alice and Sarah Furnaces of the Etna Iron Works to their late superintendent, Capt. Harry Brown, of an elaborate solid silver water pitcher, stand and cups, on the occasion of his departure from the employ of the company. On Wednesday afternoon last the men all as-

sembled in the great stock house of Alice Furnace, where on an improvised rostrum rested the bulky present, still draped. When all was in readiness President Pluemer, whom the men had taken into their confidence, brought in the unsuspecting captain, who, quite at a loss for a moment to understand the meaning of the gathering, had already begun to think of strikes, when Jim Bryant, the venerable darky of Etna—the oldest employee of the company, and most fitly the orator of the occasion—ascended the rostrum, and in a well-set speech and in glowing terms set forth the high regard in which the men had held their superintendent, and the

Neilson and Myron B. Wick, on the 26th ult. forwarded a vigorous protest to the managers of the several lines. One of the changes urged is that the rate on bar iron to Chicago, which is now 13 cents, should be reduced to 10 cents.

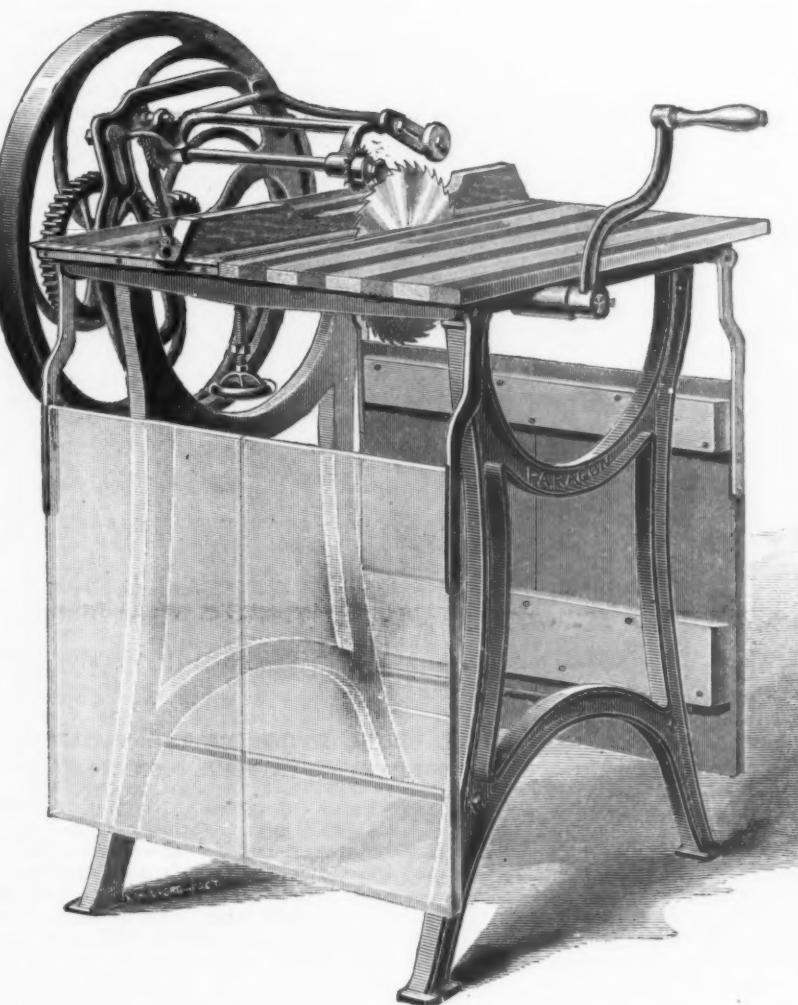
New Hand-Power Rip Saw.

The Seneca Falls Mfg. Company, of Seneca Falls, N. Y., have just brought out a new self-feed rip saw for hand-power, an engraving of which we annex. It is a strong, substantial and thoroughly well built machine of large capac-

itself in a short time. Should occasion require, a pulley can be attached to the driving shaft in place of the balance wheel for steam-power. Any size from 6 to 10 inch saws can be used on this machine. With each machine one 10 inch rip saw is furnished. The weight of machine is 245 pounds.

Referring at length to the subject of "Single vs. Coupled Locomotives," the London *Engineer* remarks: The tendency in the present day is to run at higher and higher speeds, but it is certain that the limit has been reached in this direction, and that something very novel in railways will be needed if any marked advance is made. There is no reason, however, to think that the limit has been nearly reached in the weight of trains, and engines of augmented power are built to haul these trains at maximum speeds. The power of an engine is, however, mainly determined by the size of the grate, and it is a very difficult thing to get in a grate of sufficient size while the engine is coupled behind. It is true that Mr. Stroudley has shown that an engine may be coupled before, but his example has not been followed, and taking things as we find them the difficulty exists. It is not safe to use a coupling-rod more than 9 feet long, and with an inside cylinder engine this means 7 feet as the maximum length of the grate, and an area of less than 20 square feet. When the trailing-wheel is small the grate can be carried over the axle, but when it is large the practice entails well known disadvantages and troubles. With single drivers a grate of almost any dimensions may be used, and this is perhaps one of the reasons why such engines are now in favor; but the principal reason is, no doubt, that steel rails and tires and the sand blast render it possible to get all the adhesion really needed without resorting to coupling.

In an interesting paper entitled, "Considerations Relating to Our Naval Wants," recently published in *Congress*, Admiral Ammens remarks pertinently: "A clean bottom is a necessary element for speed; as a practical measure of the opinion of experts as to this, we know the anxiety of yachtsmen to clean the bottom of a vessel immediately before a race. Precise information as to the effect of a foul bottom on speed would surprise many persons who have the idea that they know all about the question, without having gone to sea, or perhaps without even a study, in some degree possible, through old log books, by closely considering the logged distances in making runs in smooth weather, with the actual number of revolutions of screw made at such times. If any one of our new fast cruisers with a perfectly clean bottom should be sent to Port Royal or any other salt water Southern port, and to make at sea careful comparisons of revolutions and distance logged under the most favorable conditions of weather, and again to make the same comparisons after lying at anchor for four or six weeks, and continue them for three months at different periods, any idea that the fast cruiser handicapped with a foul bottom would be able to catch the better class of steamers plying between ports, and having clean bottoms, will be at once dispelled. After six months in Southern waters the fast cruiser would hardly be able to catch the ordinary 'sea tramp' that seeks a cargo in whatever port."



NEW RIP SAW, BUILT BY THE SENECA FALLS MFG. COMPANY,
SENECA FALLS, N. Y.

sincere regret with which they now saw him depart. Then wishing him "God-speed" in his new field of activity he uncovered the glittering mass of silver, and raising it he extended it to the bewildered captain. Mr. Brown, although laboring under some excitement, responded eloquently, expressing his thanks, and giving a few good morsels of advice in parting to his men. He leaves on Saturday for Richmond, Va., where he will take charge as manager of the Virginia State Granite Company's quarries, to which position he was appointed by his old employer, Mr. A. Pluemer. The good wishes of his many friends throughout Ironton follow him.

The iron manufacturers of the Mahoning Valley, Ohio, are making an effort to obtain a reduction in freight rates. They claim that under the present charges they are being discriminated against. A committee, consisting of H. B. Shields, James

ity, taking work of any width up to 3½ inches thick. It has two changes of speed and can be driven from either side of the machine, as desired. It has an adjustable feed which is self-adjusting for all ordinary work and is positive in its action, the power being transmitted from the driving shaft by gears. The feed has three changes of speed, fast, medium and slow, adapted to the various kind of work in ripping, grooving, &c. The table is of hard wood and is provided with an adjustable gauge, and, being hinged at the back, can be raised or lowered by the hand screw for grooving, rabbeting, &c. For ripping long stuff it has drop leaves which may be raised, making a long table. With this machine one man, it is claimed, can easily cut soft wood up to 3½ inches, and hard wood to 2 inches thick, doing the work of from four to six men with the common hand saw. It works accurately, saves time, lumber and labor, and will pay for

The great rock tunnel recently completed through the Cascade range of mountains, in Washington Territory, for the Northern Pacific Railroad, is fully described in Western dispatches. The contract was let to Wilson Bennett for about \$2,000,000,

and work was begun in the middle of April, 1886. The material and machinery had to be hauled in wagons a distance of 90 miles over a rough country with hardly a road, and some of the heavy machinery was moved by block and tackle the whole distance, and \$125,000 had been expended before the actual work began. Men were scarce, but the contractor procured them from all parts of the Union and from Europe, but until the Cascade Division was finished he had difficulty in keeping the work moving. Since the completion of the Switchback the progress of the work has been marvelous. The tunnel is 9850 feet long and 16 feet wide by 20 $\frac{1}{2}$ feet high in the clear, and is intended for a single track road. The work has been constantly prosecuted from both ends since the first start was made, and the meeting of the two crews in the heart of the mountain took place May 3. The machinery used in constructing the tunnel was of the most approved kind. The air compressors are one Ingersoll and one Clayton, the latter run by water-power. The plant on the east end consists of four 70-horse power steel boilers and two Ingersoll and one Clayton compressors, one Lefel water-wheel, one large double exhaust pan, one 45-horse power engine, complete electric light plant, machine shop, blacksmith's shop, telephone, 15 Ingersoll Eclipse drills, one trimming drill, one locomotive of the H. K. Porter pattern, all the necessary cars, wheelbarrows and tools, stores, boarding houses, stables, horses, &c. On the west end there is a duplicate of the east end plant, except the Clayton compressor.

Improved Small Dynamo.

We illustrate herewith a small dynamo that has been recently improved by the makers, the Waterhouse Electric and Mfg. Company, of Hartford, Conn. The field magnets are bolted to an iron base having a groove near the outer edge to collect any slight overflow from the oil receivers, which would otherwise saturate the wood foundation. Under the pan are two iron slides provided with set screws for moving the dynamo and tightening the belts. A new and improved brush-holder has been adopted. The commutator is a fine piece of work, and is made of drop forged segments of copper insulated from each other. Altogether the dynamo is a compact little machine, and runs very smoothly. The Waterhouse regulator applies to the small as well as the large dynamos, and with the Waterhouse arc lamps a very perfect outfit is obtainable. The Waterhouse regulator is but little understood. It will be noticed that there are three brushes on the commutator. The forward upper or auxiliary brush carries a current of low potential to the conductor from the auxiliary brush will carry eight amperes, and the two will make the ten amperes on the line.

The regulator was one of the features that led to an award of a gold medal at the Mechanics Fair, at Boston, at the last exhibition. The Waterhouse system is successfully running in many of the representative mills in this country, and in such cities as New York, Baltimore, and Newark, N. J. The company manufacture arc plants of 3, 5, 10 and 12 lights and larger plants of 20, 30, 35 and 40 lights, or with any multiple of these numbers.

Mr. S. B. Whiting, general superintendent of the Philadelphia and Reading Coal and Iron Company, of Pennsylvania, for many years, has resigned to become general manager of the Calumet and Hecla Mining Company, of Michigan. R. C. Luther, at present chief engineer, will succeed Mr. Whiting.

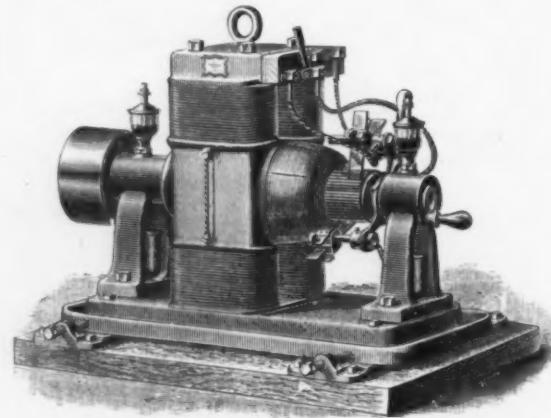
The propeller Adams, built at Wheeler's ship yard, Bay City, Mich., for Farwell & Adams, of Detroit, was launched on the 24th ult. Her dimensions are: Length over all, 280 feet; beam, 41 feet; depth of hold, 21 feet; tonnage, 2600. Her machinery is of the latest improved pattern, and it cost \$130,000 to build the vessel.

be produced as to destroy the entire plant. The value of a regulator can therefore be appreciated. The effect with the Waterhouse regulator when lights are cut out is to increase the current that passes out at the auxiliary brush and decrease the current passing around the field magnets. The generating capacity of the dynamo is at once reduced and the tendency of the current is to decrease instead of increase. So fine is the regulation that only the necessary amount is allowed to pass around, the field magnets producing at all times on the lamp line the standard current, whether one light or the full number are in circuit. For instance, if five amperes are flowing around the field magnets and the standard passing through the lamps is ten amperes, the amount passing out at the auxiliary brush outside of the dynamo would be five amperes. Now suppose lights are cut out. The regulator immediately adjusts the current, passing around the field magnets, and if the current is then three amperes the amount passing out at the auxiliary brush would be increased to seven amperes and the remaining lamps would be supplied with the standard, ten

Recent Legal Decisions.

CARRIER—DELAY IN SHIPPING MACHINERY.

An express company negligently delayed shipping a piece of mill machinery and an action was brought for damages. The delay in shipping was for 14 days, while the delay in repairing the machinery after it was delivered was four months, and it was claimed that this fact should be considered in allowing damages. In the contract of shipment it was stipulated "that the said express company shall not be held liable for any claim of whatsoever nature arising from this contract, unless such claim shall be presented in writing within 60 days from the date hereof," and it was set up in defense to the claim that, as it had not been brought in that time, there could be no recovery. In this case the plaintiffs had judgment, and the company appealed—Pacific Express Company *vs.* Darnell—to the Supreme Court of Texas, where the judgment was affirmed. Judge Gaines, in the opinion, said: "1. The plaintiffs were entitled to recover, as they



IMPROVED DYNAMO FOR SMALL SHOPS, BUILT BY THE WATERHOUSE ELECTRIC & MFG. COMPANY, HARTFORD, CONN.

have recovered, for the expense of idle hands employed; the loss on contracts for sawing, and for grinding corn, and any other profits from running the mill, and this loss may be ascertained by finding a day's profit and multiplying that by the time lost. 2. The delay of four months in repairing the machinery after it was delivered by the company cannot avail it as any defense to mitigate the damages. It is reasonable to suppose that the repairs would have been completed two weeks earlier if the delivery had been made in time. 3. The stipulation as to sueing within 60 days is not a bar to this action. Any reasonable limitation contained in a bill of lading will be enforced by this court. But is this a reasonable limitation? We think not. If it had been stipulated that a claim should be made in 60 days from the ascertainment of the loss, the case would have been different. But to require a shipper to give notice of his claim within a short period of the date of a bill of lading, without reference to the time when a loss for the breach of the contract to carry had accrued, is to impose a restriction which, in many cases, would deny a right of action, and thereby permit the carrier to contract against his negligence, which is never allowed."

PARTNERSHIP—COMPENSATION OF PARTNER.

W. & Co. and McC. formed a partnership under the name of J. W. McC. & Co., and it was agreed that McC. should manage the business, giving it his undivided

attention, and that he should be paid \$100 a month salary. This firm continued for 28 months, and McC. claimed \$2800, but it was objected that he had given two-thirds of his time to other affairs, to the neglect of the business of the firm. It appeared, however, that it was known to his associates that he did not give all of his time to the firm's business; in fact, just what he was doing was known to them, and they made no objection. He was allowed his full claim in his suit for an accounting, and the defendants appealed to the Supreme Court of Arkansas, where the judgment was affirmed. On this appeal—Weeks *vs.* McClintock—Judge Battle, in the opinion, said: "Partners in equity may be held by their conduct to have changed the terms of a written agreement into which they have entered for carrying on a concern, and to have substituted the terms to which they have adhered instead of the terms contained in the original agreement. In this case this has been done. For more than two years McC.'s partners saw and knew how he was managing the business of the new firm. They made no complaint to him as to his manner of managing it. He had a right to presume from this silence that they approved of his course of conduct, and to continue to act on that presumption. They accepted his services, acquiesced in his conduct, and waived their contract with him to the extent of requiring him to give the firm's business his undivided time and attention. It is too late for them to dispute his right to his wages after they have silently accepted his services for the period of 28 months."

LIABILITY OF CARRIER.

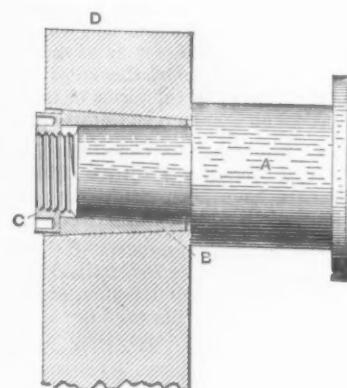
Platt, the assignee of an insurance company, sued a railroad company to recover the amount of a policy they had paid on cotton carried by the railroad company which had burned, as was alleged, by their negligence. On paying the loss the insurance company had taken an assignment of the policy. By the bill of lading the carrier was to be exempt from any claim for loss "by fire, unless the same be proved to have occurred from the fraud or gross negligence of the company or companies, their agent or agents." The cotton was shipped in South Carolina for New York and was burned at a point in Virginia while awaiting shipment by the defendant. The action was brought in a New York court. By the laws of South Carolina "no special contract shall affect or limit the liability at common law of any railroad company within this State, for or in respect of any goods to be conveyed or carried by them." By the bill of lading it was, also, provided that "if any legal liability shall be incurred by the carrier in the course of transportation, it shall have the benefit of any insurance which may have been effected upon or on account of the said cotton." The plaintiff did not undertake to show any fraud or gross negligence on the part of the defendant, relying upon the fact of the fire and its claim as assignee of the policy. Defendant had judgment, and the case—Platt *vs.* Richmond, Y. R. and C. Railroad Company—was carried to the Court of Appeals of New York, where the judgment was affirmed. Judge Earl, in the opinion, said: "1. The bills of lading having been proved at the trial, and it being shown that the cotton had been burned, the provision of the bill as to the carrier's liability came into force. The burden of proof was upon the plaintiff to establish that the fire was occasioned, and the cotton destroyed, by the fraud or gross negligence of the defendant. These facts are not shown by the plaintiff. 2. The condition of the bill is valid; it is not affected by the South Carolina statute. That is to be applied only to the railroads of its own State, as we think, by its terms. 3. But there is a

further defense to this action. By a special stipulation in the bill of lading the defendant is entitled to the benefit of the insurance, and payment by the insurance company to the owner of his full loss discharged the defendant from all liability. The right of subrogation, claimed here under the assignment, is a derivative one, and comes solely from the assured, and can only be enforced in his right. If the assured has no right to be transferred to the insurers, then the insurer can have no subrogation. In this case, by the express contract of shipping, the carriers were to have the benefit of the insurance. If the insurance company had not paid the loss to the assured, upon the payment of the loss by the defendant it would have been entitled to be subrogated to the rights of the assured, and to the full benefit of the policy which the assured had taken."

New Method of Inserting Crank Pins.

In a short paper presented at the meeting now in progress at Nashville, Tenn. of the American Society of Mechanical Engineers, Mr. C. C. Collins brought to notice a new and apparently very good method of inserting and securing crank pins.

The circumstances responsible for its application were as follows: Some time



New Method of Inserting a Crank Pin.

since, in making some experimental machinery, it was found desirable to use a crank shaft in which the crank pin could be changed, sometimes using 8-inch throw and sometimes using 12-inch throw. That is, in a part of the experiment, the piston, which was 14 inches in diameter and loaded to 250 pounds to the square inch, would have a stroke of 24 inches; then it would be changed to 16 inches, these changes being made a number of times. It will be seen that with this pressure, whatever method of securing the crank pin might be adopted, it must be one which, when the pin was in place, must be practically unyielding and not liable to work loose, at the same time it should be one which would allow of easy removal of the pin without injury to either crank or pin. The plan which was adopted will be readily understood by reference to the accompanying sketch.

The holes in the crank D were bored taper, largest at the back side. The bush B was also bored taper and turned on the outside to fit the taper-hole in the crank, so as to bring the edge to within about $\frac{1}{2}$ inch of the front face of the crank. In fitting this bush the taper-hole in the crank was scraped so as to insure the absolute truth of crank-pin in relation to the shaft. The pin A was then turned and fitted to the bush B, so that the shoulder should be at the same distance from the edge of the bush that the face of the crank was—viz., $\frac{1}{2}$ inch; this bush was then cut

from end to end, so as to give it a chance to expand or contract, and it thus became a circular wedge between the crank and the pin. The end of the crank-pin is fitted into the nut C, care being taken that the thread is a good fit. It is better not to make pitch of the thread too coarse. Now insert the pin A, and place the circular wedge B in at the back between the pin and crank, and force it well home by means of the nut, and you have a pin as rigid as if it had been put in by means of shrinking or forced in by means of hydraulic pressure, and yet one easily removed without injury either to pin or crank.

This particular pin was never subject to a continuous test in running, but it showed under a variety of trials that it would stand up to its work without fault. It is thought that this method employed on built-up double crank would be of great utility, especially where for any cause crank-pins have to be renewed.

The great strike of the employees at the Edgar Thomson Steel Works of Carnegie Brothers & Co., Limited, at Braddock, Pa., was officially declared off on Friday, the 4th inst., by the District Master of the Knights of Labor, and the members were advised to apply for positions at once, as their places were being rapidly filled by non-union men. The act of calling the strike off was only a formality, as no one realized better than the Knights of Labor that they were fighting a hopeless battle and that they had already been defeated. It is to their credit that during the three months of the strike there was no disturbance of any kind at the works. It is stated that over 100 members of this organization have lost their situations at the works and will be compelled to move away from Braddock. The Knights of Labor have suffered a crushing defeat and it will take them a long time to recover from it. The 100 Pinkerton detectives who have been stationed at the works for some time have all been discharged. Fortunately their services were not required. A member of the firm furnished figures to show what the men have lost by the strike. Up to the early part of last week they lost about \$825,000 in wages. If they had accepted the first proposition of the firm, made in February last, they would have been that much better off. All departments of the works, including five of the seven blast furnaces, are now in successful operation, and from all appearances the works will be running double time during the present week.

Interest is being taken in Kingston and Pembroke iron stock on the shipment of the first cargo of ore since navigation opened, and the announcement of the largest consumer in Pittsburgh that if the cargo proved satisfactory he would take all the product of the mine.

At Newark, N. J., on the 30th ult., A. Q. Keasbey, as counsel for Benjamin Atha, applied for the appointment of a receiver for the firm of Atha & Co., proprietors of the Newark Steel Works. He alleged that the litigation between the partners over the ownership of a patent had rendered it impossible for them to conduct business in harmony. The assets of the company were represented as several hundred thousand dollars over the liabilities, and for that reason a receiver was asked for. No decision was given.

It is stated that the iron manufacturers of the Mahoning Valley, Ohio, have decided to form an association for mutual protection and have appointed a committee to prepare a plan. A meeting will be held shortly to form an organization.

THE WEEK.

Some time ago the Union Telegraph Company were sued in the courts by the Inman Steamship Company to recover \$2000 for the loss of a steamship screw, broken by contact with the submerged cable in the North River. The Telegraph Company now seek indemnity to the amount of \$60,000 for the cost of repairs and loss of business caused by the steamship's wheel "churning" the cables.

The first full cargo of copper down the lakes this season left Houghton, Mich., last week.

Two bids for the construction of a submarine torpedo from Cramp & Sons were opened last week, one for \$175,000 and the other \$135,000.

Florida has shipped to the New York market this season, opening with November and closing with April, some 350,000 boxes of oranges.

Chief Arthur contradicts the report that the Burlington strike has been declared off. He says: "The men are holding out in the hope that there will be something done at the annual meeting of the Burlington directors, which will be held on the 17th of this month. They think there may be a change made in the management at that time which will be favorable to the Brotherhood. I can say positively that there will be nothing done toward declaring the strike off until after that date."

The quicksilver business in California is represented by a capital of \$30,000,000; it is protected by a duty of 10 per cent. ad valorem. The tariff bill now before Congress would abolish this slight protection, while California would raise the duty slightly.

A Connecticut firm is said to have received an order from the Russian Government for 40,000,000 copper cartridge cases.

The underground and arcade railway projects both give signs of new vitality. The former, represented by Mr. Lauterbach, who purchased the franchise, obtained a mandamus requiring the Commissioner of Public Works to issue a permit to begin the excavation. The Arcade Railway Company, as appears from a statement filed by the secretary, has entered into a contract with a syndicate of American capitalists, with European associates, for the construction of its underground railway. The plan is to build under Broadway, from the Battery to Fifty-ninth street, a railway of four tracks, two for way trains and two for through trains. From Fourteenth street there will be a branch extending up Fourth avenue to the Grand Central Depot, while from Fifty-ninth street the main line will proceed underground to the Harlem River, which it will cross by a tunnel at Madison avenue.

A traffic contract has been arranged between the Northern Pacific and Red River Valley roads, which gives the former the right to run its trains over the Red River road into Winnipeg.

The New York Legislature by a unanimous vote pronounced against the invasion of City Hall Park by erecting the proposed criminal court building.

Cleveland is preparing for the presence of nearly 2000 leading scientists of the country, who will convene in that city Aug. 14, to attend the annual meeting of the American Association for the Advancement of Science.

A statement submitted to the Dominion Parliament shows that the Government has paid to the Montreal Harbor Commissioners a total of \$2,725,000 for river and harbor improvement, and that \$200,000 more are asked for to deepen the St.

Lawrence to 27½ feet at low water. The sum of \$1,042,000 has been paid to Quebec for deepening the channel and for a graving-dock.

Dredging machines are about to commence operations at the junction of the Harlem River and the Hudson.

Fire insurance underwriters are speaking contemptuously of automatic sprinklers and fire extinguishers that fail to extinguish.

Alleged defects in the construction of the new aqueduct are the subject of investigation by a committee of engineers, and palpable frauds are said to have been discovered. In one case the defect, it is said, cannot be remedied for less than \$175,000. Some of the contractors are liable to suffer.

By the merging of Trenton and its suburbs into a single municipality that large center of manufacturing suddenly leaps from a population of 43,000 to 60,000.

The seal on the Alaskan islands have, in the 18 years since we bought Alaska, repaid almost its entire cost. Russia received from the United States \$7,200,000, and the company to which the Government leased the sole right to take seal, with the restriction to kill only males, and only a certain number each year, has paid the Government since May, 1870, to June, 1887, \$5,059,665. At the same time reports of Government inspectors show that the seal are more numerous now than they were in 1870. The Secretary of the Treasury says the records of the Departments show no violation of the terms of the lease to the Alaskan Commercial Company.

The Chatsworth disaster cost the Toledo, Peoria and Western Railroad \$235,000. Settlements have been made with representatives of all persons who were killed.

Many of the coke producers of the Connellsburg region have determined to rid their mines of foreign laborers, and have issued orders that no one shall be employed who is not thoroughly conversant with the English language.

Another important change is announced in the Japanese Government, the Prime Minister Ito having resigned to be succeeded by Count Kuroda. The former becomes the chief advisor of the Mikado, and among Japanese statesmen none rank higher than Kuroda. The precise bearing of this change on the subject of treaty revision will doubtless become apparent in due time.

A car of Dupont powder exploded at a point on the Philadelphia and Reading line, between Mount Carmel and Locust Gap, on Sunday night. Eight persons were killed, 30 more or less seriously injured, and property was destroyed to the value of \$75,000. A collision was the cause of the disaster.

Carnegie, Phipps & Co. have issued a circular to their employees, offering to take their money on deposit at 6 per cent. interest, or to loan them money on mortgages at a small rate.

Denmark's exhibition of Scandinavian industrial products opened at Copenhagen on Tuesday of this week. The World's Fair, at Barcelona, in Spain, opens a week later, and June 2 Belgium will begin its International Exhibition, for which an invitation was sent to the United States.

Another trust has come into existence, called the Farmers' Federation of the Mississippi Valley. Capital, \$20,000,000.

The master and journeymen bricklayers of Philadelphia have agreed upon rules defining the relations between them and their apprentices. Employers who desire to take apprentices shall notify the Joint Committee, who shall decide the number to

which each shall be entitled. The employer is to give work to and pay his apprentice during the entire year, excepting as arrangements shall be made for attendance at school. All apprentices shall be paid according to the scale for four years or until of age. There shall be no discrimination in any case as to who an employer shall take as an apprentice. All apprentices serving the full term shall be entitled to admission to the association. Employers will not be allowed to take any apprentice, unless they have been in business two years. They will probably be thankful for small favors.

Permits were taken out in Philadelphia in April for the erection of 1205 dwellings, a number never before equaled for that month in the year.

Ezekial Ezra Smith, Principal of the North Carolina State Normal School, and formerly a slave in North Carolina, has been chosen by President Cleveland to be Minister to Liberia. He was one of the founders of the North Carolina Industrial Association, and favorably known as an editor.

The plate glass manufactory located at Creighton, Tarentum and Butler, in Pennsylvania, in which Pittsburgh capital is largely invested, have within a year or two doubled their capacity, and from present appearances will have all the business they can do this year.

It is reported from Chicago that Western railroad men have decided not to build any more roads until there is a marked change in the tone of granger legislation. A contractor who has built a number of railroads in Kansas for the Missouri Pacific system, reports Mr. Gould as saying positively that he will not have a mile of new railroad built for his account this year.

Chicago packers deny that there is in existence, as has been alleged, a "cattle trust." One of the firm of Armour & Co. says they buy in the open market, subject to all the conditions that influence supply and demand, that respecting the decline in the prices of stock it is due entirely to overproduction.

A Cuban correspondent speaks in glowing terms of the city of Cienfuegos, its present and future: "Millions of dollars of American capital are invested here. Many of the largest sugar plantations are owned and operated by capitalists in Boston, New York and Philadelphia, and it is not unusual to find the handsomest structures of the really beautiful city owned by Americans, while a large number of the most important commercial houses owe their prestige to American money and the association of American business men. Cienfuegos cannot but soon rival Havana in business importance, and should there be a successful completion of a canal across the Isthmus I venture the prediction that here will be found in a quarter of a century the largest, richest and most brilliant city of America south of New Orleans."

As an argument in favor of rapid transit in New York City, as a means of relief not only for the demands of a growing population, but from the alleged extortion of the elevated roads, one of our contemporaries says: "The Manhattan system is now extracting from the resources of the people a yearly sum equal to 5 per cent. upon fully three times the cost of its structure and equipment. A liberal estimate of the cost of the elevated roads is \$400,000 a mile, or \$13,000,000 for the whole system. The equipment and real estate added would put the entire cost at less than \$18,000,000. The capitalization exceeds \$50,000,000. Last year the net receipts above all expenses were \$3,114,080, which were distributed in payment of interest on bonds at 6 and 7 per cent. and a

per cent. dividend on \$26,000,000 of stock. The net income was equivalent to 5 per cent. on \$62,281,600, or \$44,522,253 more than the cost of the roads and their real estate and equipment. In other words, the people are compelled to pay a liberal profit, not only on the capital invested, but on more than twice as much fictitious capital."

Scotch investors in the far West who aspired to rival the cattle kings of America seem to have met with poor encouragement. "There are at present," says the London *Economist*, "nine companies, with a paid-up capital of £3,610,000, upon the ordinary portion of which no dividends were distributed in 1887," and, according to another authority, six of the nine carried debts amounting to more than £1,500,000. Profits realized in the cattle business are no longer what they were a few years ago. Besides, the general Government no longer allows free pasturage.

The Dock Commissioners leased and renewed leases of 35 of the city's docks and bulkheads for an aggregate rental of about \$112,000.

Those two great channels of traffic, the Suez Canal and the Sault Ste. Marie Canal, at the entrance of Lake Superior, afford some interesting points for comparison. In 1887 8555 vessels passed through the St. Marys Canal in 216 days, comprising the season of navigation, carrying 5,494,649 tons of freight, or more than one-fourth of the whole tonnage of the great lakes. In 1886 the tonnage of the canal was 4,219,769, as compared with 1,734,890 in 1880. As compared with the business of the Suez Canal the St. Marys Canal was 561,228 tons in July, 1886, against 528,671 for the Suez Canal. The daily tonnage has been larger recently on the St. Marys Canal than that of the Suez Canal, though the latter has much the larger annual tonnage, being open the whole year, against, say, seven months for the St. Marys Canal. While open, the latter, in 1887, had a tonnage of 18,837 per day, and the former 15,802 per day. The cost of the Suez Canal down to 1877 was \$92,000,000, while but \$3,087,500 has been expended on the St. Marys Canal. In 1887 the Suez Canal earned \$13,000,000 at a charge of \$2.05 per ton. The same charge would have given a revenue of \$8,000,000 to the St. Marys Canal, or more than the whole expense in the past and the proposed cost of the new locks.

Edward Augustus Hopkins, a gentleman who has spent 47 years in the countries tributary to the Rio de la Plata, described to the New York Chamber of Commerce the state of our commerce with that region, and insisted upon the importance of increasing it. Mr. Hopkins called attention to the fact that of 4727 foreign sailing vessels entering the ports of those countries in 1886 only 225 were from the United States and only 64 sailed under our flag. He advocated the carrying of our ocean mails in native iron ships and said that our consular system in South America was in need of radical improvement. The subject will receive further consideration.

A mill for the manufacture of the finer grades of cotton goods is about to be erected at Columbus, Ga., making a new departure in this line of enterprise.

The Minnesota journals think that the far Northwest Canadian Peace River Valley, containing an area about equal to that of the State of Indiana, and lying north of 55° , can be utilized for agricultural purposes. The Minneapolis *Tribune*, speaking of that section of country, says: "The Peace River traverses the Athabasca territory in a northeasterly direction until it empties into Lake Athabasca. The soil in the river valley and the plateau bordering upon it is for the most part a fine silt,

and its fertility is great. The land is partly prairie and partly wooded. The total area of land with soil well suited to agriculture is not less than 26,000 square miles. 'The luxuriance of the natural vegetation on these prairies,' says Dr. Dawson, 'is truly wonderful, and indicates not alone the fertility of the soil, but the occurrence of a sufficient rainfall.'

The western terminus of the Lehigh and Hudson Railway, for which the right of way has been secured, connects at Belvidere, N. J., with the Pennsylvania system of roads, and this new link, it is claimed, will not only be the first, but by far the best and shortest route from the Hudson River to the coal fields of Pennsylvania.

The storage of petroleum in large iron tanks in the heart of New York City, as proposed by the Standard Oil Company, excites alarm. One of the locations chosen is in a section of the dry goods district, near Broome street. Fire underwriters declare that insurance could not be placed in neighborhoods exposed by the presence of such reservoirs. The oil referred to is intended for use in the manufacture of illuminating gas, and it is well known that such gas cannot be made from a non-explosive high-test oil. Quite recently gasoline or some kindred substance escaped from the engine-house attached to the gas works in Fortieth street and an explosion took place that cost \$40,000. The disastrous explosion of gasoline in the sewers at Rochester is another example of the inflammability of this substance.

The future of Duluth as a great shipping port is promising. It now claims to ship the largest amount of wheat of any port in the world. Last year the grain shipments were 19,518,586 bushels, against 11,551,582 in 1884; 209,850,000 feet of lumber, against 161,800,000 feet in 1886; 74,300,000 shingles, against 22,600,000 in 1886. The town and vicinity has 186 miles of dock line, and is the terminus of 11,485 miles of railroad. The head of Lake Superior is the nearest deep water point for all that section of country northwest and north of a straight line running from Sault Ste. Marie to a point in Lower California on the Pacific Ocean, and it is but 1400 miles from New York. The great Dakota and Red River wheat fields are from 150 to 450 miles nearer Duluth than Chicago. The flour mills of Minneapolis are but 150 miles from the head of Lake Superior, but they are more than 450 miles from the head of Lake Michigan. The recent improvements in elevators at the head of Lake Superior have been on a large scale. At Duluth and Lake Superior elevators of the largest capacity have been built since last season. An entirely new line of railroad is projected from Duluth to Port Arthur, where it will connect with the Canadian Pacific.

The oil report for April shows that the great shut-down in Pennsylvania has almost entirely cut off drilling operations. Only 50 wells were completed in the oil fields of Pennsylvania and New York. The shut-down will continue until November 1, 1889, by which time it is expected that the great surplus stock on hand will have been disposed of.

The Wabash Railroad has decided to run steamers on the lakes during the season now opening. The boats will run from Toledo to Buffalo.

The Massachusetts railroad commissioners who have been considering the car-heating problem came to the conclusion that the system of heating by steam from the locomotive is not only practicable and conducive to the comfort and safety of passengers, but it is a desirable measure of economy; that it should be adopted as the standard throughout that State, and that

the use of the separate heaters in or under cars should only be permitted in exceptional cases. The companies have another year in which to introduce their improved heating appliances.

The important lumbering interests that formerly flourished at Middletown, N. Y., on the Upper Delaware, also the tanning business, dependent on the growths of forest timber, are fast dying out, to be succeeded by dairymen and productive quarries of bluestone.

The large twine manufacturers, Hooven & Allison, in Ohio, made an assignment last week, and the Second National Bank of Xenia, which held considerable amounts of their paper, was compelled to close its doors. The assets of the twine and cordage firm are largely in excess of the liabilities, and it is expected that they will settle with their creditors in full. Pending a settlement several of the local traders are affected by the embarrassment.

An industrial school is about to be established in the city of Cambridge, Mass., through the munificence of Frederick H. Rindge. The plans contemplate a course of industrial training parallel to the high school courses, taking boys who have gone through the grammar schools or passed the required examinations. The peculiarity of this school will be a building for industrial training alone. The time of the pupils will be equally divided between the workshop and study—three hours to each. The departments to be opened for industrial instruction are to be drawing, carpentry, blacksmithing, machinework and printing. Instruction will be free, but it will be limited to boys of good physical condition who have lived in Cambridge for a certain time yet to be decided upon.

A well-known firm of Chicago packers are putting up a new building at the Stock Yards which will measure 225 x 425 feet and have a capacity for killing over 1000 beefs a day. One of the interesting and novel features of the new structure will be the ice machines of the ammonia compression kind, which will manufacture 125 tons of ice a day.

The regular monthly meeting of the Merchants' Steel Association of the United States, which is composed of the Crucible and Open-Hearth Steel Manufacturers, was held in the Monongahela House, Pittsburgh, on Thursday, the 3d inst., the following firms being represented in person:

Hussey, Howe & Co., Limited, Pittsburgh. Park Brothers & Co., Limited, Pittsburgh. Linden Steel Company, Limited, Pittsburgh, Pa.

Smith Brothers & Co., Pittsburgh, Pa. Miller, Metcalf & Parkin, Pittsburgh, Pa. Singer, Nimick & Co., Limited, Pittsburgh, Pa.

Anderson, Du Puy & Co., Pittsburgh, Pa. Sterling Steel Company, Limited, Pittsburgh, Pa.

Brown & Co., Pittsburgh, Pa.

Benjamin Atha & Co., Newark, N. J.

Spaulding, Jennings & Co., Newark, N. J.

Bolton Steel Company, Canton, Ohio.

Detroit Steel and Spring Works, Detroit Mich.

Gautier Steel Department of Cambria Iron Company, Johnstown, Pa.

The Farist Steel Company, Bridgeport, Conn.

James H. Brown, of Hussey, Howe & Co., Limited, chairman of the association, presided. The session lasted all day, but no action of importance was taken. Trade was reported as being extremely quiet. No change was made in the list of extras on merchant steel published in *The Iron Age* of February 23d last. The next meeting of the association will be held in New York City on Thursday, June 7, next.

MANUFACTURING.

Iron and Steel.

A dispatch from Birdsboro, Pa., under date of the 2d inst., reads as follows: "Four hundred men are idle here by reason of the refusal of the puddlers of the E. & G. Brooke Iron Company to go to work yesterday at \$3.25 per ton. George Brooke, the proprietor, refuses to pay any more, and a shut-down for months will be the probable outcome, as there is a heavy stock of manufactured product on hand. The men are also out at Douglassville, three miles below this place, for the same reason."

A contract was executed a few days ago with an English syndicate, providing for the erection of blast furnaces and rolling mills on the Cascade division of the Northern Pacific Railroad. On the completion of these works they will probably yield a revenue of \$1,000,000 per annum to the railroad company.

Etna Furnace, Etna Iron Works, Limited, New Castle, Pa., blew out April 20 for an indefinite period.

The Hollidaysburg Iron and Nail Company, of Hollidaysburg, Pa., whose works have been idle for some time past on account of a strike of the employees, are making extensive and much-needed repairs to their plant. The report that the company would attempt to start up with non-union men when these repairs are completed is without foundation. No preparations whatever have been made to restart the works.

The Vulcan Furnace Company, who operated the charcoal furnace at Newberry, Luce County, Mich., have been succeeded by the Newberry Furnace Company.

On Monday, the 30th ult., the eighth of the large welding furnaces composing the lap-weld department of the National Tube Works Company, at McKeesport, Pa., was put into operation. One more furnace makes up the mill, but it is being modeled for electric welding, and is virtually out of use. These furnaces have been increasing their product for months back, until to-day the average output of 24 hours can be placed at 85 tons each, to 40 tons of a year ago.

Fannie Furnace, of the Wheeler Furnace Company, at Sharon, Pa., which has been out of blast since December of last year, has been thoroughly repaired and relined, and was blown in on Tuesday, the 1st inst.

Edith Furnace of the Edith Furnace Company, at Allegheny City, Pa., after a long and successful run will be blown out during the present month for relining and other repairs. As soon as these are completed it will at once resume operations. The furnace turns out about 700 tons of No. 1 pig iron per week, which is consumed by the National Tube Works Company, of McKeesport.

The works of the Pittsburgh Tube Company, at Pittsburgh, which have been closed down for more than two months on account of the refusal of the employees to accept a 10 per cent. reduction in wages, resumed operations in full on Monday, the 7th inst. The matter has been compromised, the men agreeing to accept a reduction of 5 per cent.

The nail factory of the Kelly Nail and Iron Company, at Ironton, Ohio, has been in constant operation since January last, not a day having been lost since that time. The company have 100 machines, 95 of which are in operation.

The strike at the Carrie Furnace, of the Carrie Furnace Company, at Rankin Station, Allegheny County, Pa., mention of

which was made in our issue of last week, has been settled, the men agreeing to accept a reduction of 12½ per cent. The furnace has resumed operations.

Carnegie, Phipps & Co., Limited, have begun the erection of a new office at the Homestead Steel Works. Cut stone and pressed brick will be used, and when finished the building will be the finest mill office in the Pittsburgh district.

The Mellert Foundry and Machine Company, Limited, of Reading, Pa., under date of 2d inst., write us as follows: "The pipe foundries of this company are closed. They are, however, in good repair, and can be started up at any time, should the trade and prices of pipe make it an object to do so. Our general foundry, machine shop, &c., connected with the works are running full. The new pipe foundry of the Reading Foundry Company, Limited, under the management of this company, is running full and doing very good work."

The Mahoning Valley Iron Company, of Youngstown, Ohio, are not going to build a new blast furnace, as has generally been supposed, but intend remodeling the present one. In a short time it will be torn down and entirely rebuilt, the intention being to make it a model furnace, with all the modern improvements. The stack will be 70 feet high and 16 feet bosh. When completed it will be in all respects a No. 1 furnace. The present machinery will be used in the new furnace, as it is in good condition and ample to do the work.

Jones & Laughlins, Limited, of the American Iron Works, Pittsburgh, are making large shipments of angle iron to Salt Lake City, Utah.

In our issue of last week we made mention of the fact that a number of Pittsburgh and Eastern capitalists proposed to erect a large steel works at Latrobe, Pa., providing the citizens of that place would donate a certain amount of money, and also some land, to the new enterprise. At a meeting of the citizens of that place, held on Monday, the 30th ult., it was announced that \$18,000 of the bonus required to secure the location of the proposed steel plant had been subscribed, and a committee was appointed to raise \$5000 more. The citizens will give the company 54 acres of land underlined with coal and the water company will give free water.

Princess Furnace, D. S. Cook, Glen Wilton, Va., blew out on April 16 to remodel mantle and bosh. Blast will be resumed early this month, and will be limited to six days to a week.

After the remarkable run of three years 15 weeks, No. 5 furnace of the Thomas Iron Company, Hokendauqua, Pa., is being blown out.

East Conemaugh Furnace of the Cambria Iron Company, Johnstown, Pa., is being rebuilt.

The furnace of the Vigo Iron Company, Terre Haute, Ind., has been compelled to shut down owing to the loss of the hoist and engine house by fire.

The charcoal blast furnace at Iron River, Marquette County, Mich., which has recently been operated by the Gogebic Furnace Company, was blown out a few days since and will not be put in blast again by the same company. They state that this will probably be the last effort to make iron with this plant, although the furnace is comparatively new.

The Pine Grove (Pa.) furnace is to make a ten-months' run on charcoal.

On May 1 the Coatesville Iron Company, at Coatesville, Pa., were unable to meet the interest on their \$70,000 of bonds, a majority of which is held by Andrew Williams, of

Plattsburg, N. Y., and on May 1 the sheriff levied on the company's mills there and at Laurel on a writ issued by G. H. Warner, of French Creek, for several thousand dollars' worth of blooms.

It is reported that the syndicate which will operate the Newark and Jersey Steel Works is composed of Benjamin Atha, William Clark, the treasurer of Clark's Thread Company, and John and Robert Ballantine, the brewers.

Machinery.

The Massillon Machine Company have been organized at Massillon, Ohio, with a capital stock of \$25,000. The following named persons are interested in the new enterprise: H. F. Jones, Geo. Phillips, T. M. Richards, James Killin, Abel James, John Bingham and E. B. Lieghley.

"The locomotive production at the three local establishments in April," says the Paterson (N. J.) *Guardian*, "was lighter than in any other month for some time past, with the exception of February, wherein the same number of engines, 28, was completed and shipped. The April product included 13 from the Rogers Works, several of which were for the Denver, Texas and Fort Worth Road, and three for the West Shore; nine from the Cooke Works, nearly all of them for the Lackawanna Road, and six from the Grant Works for the Chicago, Milwaukee and St. Paul Road. Thirty-nine engines were shipped in March, 28 in February, 33 in January and 43 in December last."

Messrs. Watson & Stillman, 204 to 210 East Forty-Third street, New York, have issued a pamphlet describing Vreeland's transfer jack for railroad work. A number of illustrations are also given, explaining its construction and method of application.

The Waterhouse Electric & Mfg. Company, of Hartford, Conn., have sent us a neat little catalogue illustrating and briefly describing their system of arc and incandescent lighting. Engravings are given of different forms of their dynamos and lamps, and the catalogue throughout is made up in attractive form.

Messrs. T. R. McMann & Bro., 56 to 60 Gold street, New York, have just issued a new catalogue, dated May, 1888, given up to their various lines of manufacture, which embrace wrought and cast iron pipe, all kinds of fittings for steam, gas, water and oil, radiators, &c. The catalogue is in all respects an attractive specimen of trade literature, embracing 127 pages, and being illustrated throughout. Extensive price lists and tables of dimensions are given.

The Chester Foundry and Machine Company, of Chester, Pa., have secured the exclusive right to manufacture the well-known three-cylinder Brotherhood engines for the United States, and have fitted up one of their departments with special tools for this work. The department, we understand, is under the supervision of a man from the Brotherhood shops in England, and the engines will be fully up to the standard of those of English make.

Messrs. Lodge, Davis & Co., Cincinnati, Ohio, write us under date of May 3 that they have just closed a contract for the entire outfit for the machine shops of the Mt. Auburn cable road of Cincinnati.

Contracts were awarded on the 1st inst. by the city of Chicago for engines and boilers for an electric light plant. John Mohr & Son, 32 and 34 Illinois street, got the contract for the boiler at \$3536. The contract for the engine of 400 horse-power will go to the Wright Steam Engine Company, of Newburg, N. Y., at \$4500, which was \$1200 lower than the next lowest bidder. They

also guaranteed to have the work done in six weeks, while the other bidders required 100 days' time. The plant will be located on Jefferson street, near Van Buren, on the west side.

The Pennsylvania Diamond Drill Company, of Birdsboro, Pa., with salesroom at 145 North Fourth street, Philadelphia, have sent us one of their catalogues of stationary and hoisting engines, diamond drills, chucks, &c. The catalogue is fully illustrated and gives all the usual particulars of trade interest.

Messrs. Chas. A. Schieren & Co. have recently opened a branch house at 46 South Canal street, Chicago, where they will carry a full line of their goods, Standard, Short Lap, Electric, and Leather Link belting, also raw hide and tanned lace leather. Mr. Emil Gabel, formerly president of the Gabel Belting Company, of Chicago, will have charge of this branch.

The Wainwright Mfg. Company, of Boston, Mass., report the following sales of their corrugated tube feed-water heaters during the month of April: Two to Lowell; one each to Taunton, New Bedford, Worcester and Medway, Mass.; one each to Portland and Eastport, Me.; one to New Britain, Conn.; one to Providence, R. I.; seven to New York City; one each to Nyack, N. Y., and Union Hill, N. J.; one to Cedar Rapids, Pa.; one each to Cleveland and Salem, Ohio; and one to Chicago, Ill.

A fire in Jersey City, on Saturday morning, destroyed Bernard McLaughlin's and Malloy's boiler shops and Theodore Smith & Bro.'s machine shop. The aggregate loss is about \$60,000.

The Chapman Valve Mfg. Company, of Boston and Indian Orchard, Mass., have opened a salesroom and office at No. 24 West Lake street, Chicago.

The Babcock & Wilcox Co., of New York, placed the following boilers during March and April:

H. P.	
Philadelphia Co., Westinghouse Building, Pittsburgh.....	152
Oneida Community, Lim., Community, N. Y.....	61
L. Sterne & Co., Lim., London, 2d order. Walker Bros., London, for Ceylon, 7th order.....	10
Perera & Portabella, for export.....	20
Alex. Marr, Aberdeen, Scotland.....	50
Nelson Bros., Lim., London, England.....	120
Massachusetts Inst. Technology, Boston, Mass.....	208
South Bend Iron Works, South Bend, Ind., 3d order.....	150
Cie Francaise d'Elairge Electrique, Paris, France.....	136
Alex. Smith, Aberdeen, Scotland.....	20
La Refineria, Barcelona, Barcelona, Spain.....	208
Asa Leos & Co., Lim., Bombay.....	372
S. L. Forranti, London, England.....	85
W. E. & J. Rigid, Faversham, England.....	130
Cornell University, Ithaca, N. Y., 2d order.....	500
Belasario Zayas Bazan, New York, for export.....	51
J. Arce & Co., City of Mexico.....	30
Gordon, Strobel & Laureau, Philadelphia, 8th order.....	136
London Elec. Supply Corp'n, London, England.....	3,000
J. H. Stewart, Withington, for Bahia, Brazil.....	62
Willard, Bradbury & Co., 3d order, Liverpool, for Brazil.....	83
A. B. Bary, Moscow, Russia, 18th order.....	164
Fisher & Co., Huddersfield, England.....	108
M. Crespo & Co., Havana, Cuba.....	136
Heaton Button Fastener Co., Providence, R. I.....	92
Walsh, Lovett & Co., Birmingham, England.....	102
London Elec. Supply Corp'n, London, 2d order.....	98
Schwartzkopff Co., Berlin, Germany.....	230
Henry Maurer & Son, Maurers, N. J.....	244
Louisiana Sugar Refinery, New Orleans, 4th order.....	480
Troy Steel & Iron Co., Troy, N. Y., 3d order.....	1248

Hardware.

The Ohio Lantern Company, of Findlay, Ohio, who recently removed their works

from Bellaire, Ohio, have put a few wire nail machines into their factory and expect to add additional ones, as the trade may demand. They are making three-penny fine up to and including tenpenny at present.

The Vaughan & Bushnell Mfg. Company, manufacturers of light hardware and tools, have removed from 106 and 108 West Randolph street to 89, 91, 93 and 95 South Clinton street, Chicago. They now occupy a new building which they have erected with a special view to the necessities of their business. A. Vaughan is president of the company and L. E. Bushnell is secretary and treasurer.

The Wetherald Wire Nail Company, of Findlay, Ohio, under date of the 3d inst., inform us that they expected to put their new wire nail factory in operation on Monday last, the 7th inst.

H. W. Hartman, late president of the Hartman Steel Company, with a number of other capitalists, has formed a company for the purpose of manufacturing wire mats and wire fencing until recently made by Hartman Steel Company. The new works will be known as the National Wire Mat Company. The site on which formerly stood the old hinge works has been purchased and the work of erecting a number of suitable buildings will be commenced at once.

A decision has recently been rendered in the suits brought by the Pope Mfg. Company against R. Phillip Gormully, the Gormully & Jeffery Mfg. Company, and Thomas B. Jeffery. The hearing in January before Judges Gresham and Blodgett occupied four days. On the 30th ult. Judge Blodgett read a decision of himself and Judge Gresham, dismissing the bills against the defendants.

Miscellaneous.

W. L. Scott & Co., large coal operators at Erie, Pa., have decided to abandon their coal business at Buffalo, N. Y., and the traffic has been consolidated at the port in Erie. The trade at Buffalo has been about 100,000 tons per annum, and will more than double the traffic at Erie.

The D. M. Stewart Mfg. Company, which moved to Chattanooga, Tenn., from Cincinnati, are manufacturing the Peerless lava gas tip and superheaters, lava insulators for electric light plants, metal workers' crayons used for marking metals, tailors' crayons, powdered soapstone or French chalk, foundry facings, blackboard crayons and slate pencils. Their factory is a two-story brick building, 160 x 40, with a four-story tower. The engine room is an annex. Their warehouse is 150 feet long. D. M. Stewart is president of the company, and M. L. Chapman, secretary.

Our Iron and Steel Production in 1887.

Mr. James M. Swank, secretary of the American Iron and Steel Association, has just issued his well-known annual report, covering the statistics of the production of iron and steel for the year 1887. It contains his usual clear summary of the principal features developed during the year.

The total production of pig iron in the United States in 1887 was 7,187,206 net tons, or 6,417,148 gross tons. The total production in 1886 was 6,365,328 net tons, or 5,683,329 gross tons. The increase in 1887 over 1886 was 733,819 gross tons, or about 13 per cent. The production in the first half of 1887 was 3,415,210 net tons, and in the second half it was 3,771,996 net tons, or 3,049,295 and 3,367,853 gross tons respectively.

Our production of pig iron in 1887 was divided among the fuels used as follows, in net tons: Bituminous, 4,270,635 tons; anthracite and bituminous mixed, 1,919,640

tons; anthracite alone, 418,749 tons; charcoal, 578,182 tons. In the following table the production of pig iron in the last three years, exactly classified according to the fuel used, is given in net tons:

Fuel used.	1885.	1886.	1887.
Bituminous.....	2,675,635	3,806,174	4,270,635
Anthracite and coke.....	1,176,477	1,655,851	1,919,640
Anthracite alone.....	27,913	443,746	418,749
Charcoal.....	32,944	459,557	578,182
Total.....	4,529,869	6,365,328	7,187,206

Mr. Swank estimates the consumption of pig iron for 1887 in gross tons at 6,808,386 tons, as compared with 6,191,354 tons in 1886 and 4,338,844 tons in 1885, the highest figure previous to that having been in 1881, when the apparent consumption ran up to 4,982,565 tons. The output of Bessemer steel was as follows:

Ingots.	First half 1887. Net tons.	Second half 1887. Net tons.	Total 1887. Net tons.	Total 1886. Net tons.
Pennsylvania	911,871	840,574	1,752,445	1,507,577
Illinois.....	389,784	467,729	857,513	535,602
Other States.....	825,917	342,482	678,399	498,314
Total.....	1,637,572	1,650,785	3,288,357	2,541,483
Clapp, Griffiths only.....	31,049	37,636	68,679	46,371

The greater part of ingots produced were, of course, used in the production of Bessemer steel rails. In the statement given below, the rails rolled in iron rolling mills from purchased blooms are not included:

Rails.	First half 1887. Net tons.	Second half 1887. Net tons.	Total 1887. Net tons.	Total 1886. Net tons.
Pennsylvania	650,032	571,257	1,221,289	1,097,943
Illinois.....	323,998	404,538	728,536	490,975
Other States.....	170,055	170,327	340,382	220,981
Total.....	1,144,080	1,146,117	2,290,197	1,749,899

The production of open-hearth steel has shown a marked increase during the current year, even over that of 1886, and it is now far above double the output of any year between 1880 and 1886, the highest previous to that having been 160,542 tons in 1882.

Open-hearth Steel.	First half 1887. Net tons.	Second half 1887. Net tons.	Total 1887. Net tons.	Total 1886. Net tons.
New England, New York, New Jersey.....	9,553	8,889	18,442	23,382
Pennsylvania.....	128,669	142,041	270,710	172,144
Other States.....	32,178	39,387	71,565	49,724
Total.....	170,400	190,317	360,717	245,250

The production of crucible steel was 84,421 tons in 1887, as compared with 80,609 tons in 1886, figures which were exceeded both in 1881 and 1882.

Mr. Swank includes in the production of rolled iron the make of cut nails and spikes, bar, rod, hoop, skelp and shaped iron and rolled axles, plate and sheet iron and all sizes of iron rails. For a series of years the totals have been as follows:

Pennsylvania.	Total.
1882.....	1,123,886
1883.....	1,081,169
1884.....	913,046
1885.....	940,865
1886.....	1,176,286
1887.....	1,361,270

Included in the above aggregate for the year 1887 is 23,062 tons of iron rails, 1,917,403 tons of bar, rod, hoop, skelp and shaped iron, 477,056 tons of plate and sheet iron, except nail plate, and 170,979 tons of iron and plate. The output of steel plates and sheets other than steel nail plate was 198,702 net tons, and the production of nails was 6,908,870 kegs, against 8,160,973 kegs in 1886. In 1887 the product was nearly equally distributed between iron and steel, 3,419,578 kegs of the former and 3,498,292 kegs of the latter being produced in the country during that year.

The Iron Age

New York, Thursday, May 10, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Progress of Steel.

With that correct appreciation of the changing phases of the great industries he serves so well, Mr. James M. Swank, General Manager of the American Iron and Steel Association has endeavored industriously to give numerical expression to the great development of steel during the past few years. It is a complicated problem to show statistically to what extent steel is superseding iron, chiefly because the material in many instances passes through a number of hands and because a large quantity of foreign steel enters in the form of blooms, billets, slabs, rods and finished steel. Mr. Swank estimates the quantity of Bessemer steel which goes into forms other than rails in the following manner:

Net tons.—

	1886.	1887.
Product Bessemer steel.		
ingots.	2,541,493	3,288,857
12½ off for oxidation and		
crop ends.	317,687	411,045
Finished Bessemer steel.	2,223,806	2,877,312
Steel rail except from purchased blooms.	1,749,899	2,290,197
Bessemer steel not in rails.	473,907	587,115

Since 1882, as far back as Mr. Swank's estimates reach, there has been a steady increase, the figures running:

Year.	Net tons.
1882.	150,045
1883.	198,874
1884.	231,400
1885.	414,435
1886.	473,907
1887.	587,115

During 1887 the open-hearth steel plants of the country made 360,717 tons of ingots and direct castings. Of this 19,203 tons of rails were produced, leaving, when we adopt the same system as above, 295,924 net tons. Among the imports were 347,818 net tons of steel ingots, bars, &c. It will certainly be safe to estimate that 835,000 tons thereof were other than crucible steel. How much of this was used for rolling rails is not known, but 35,000 tons is certainly an ample allowance, since the total quantity of rails rolled from imported and purchased domestic rail blooms was only 63,935 net tons. This leaves 300,000 tons. Deducting allowance for waste and oxidation this would indicate about 260,000 tons of imported material used for other purposes than rails. This points to a total consumption for steel in miscellaneous forms of 1,143,039 net tons, to which must be added imported steel hoops, plates and sheets, 26,885 tons, and a very large share of the 167,272 tons of wire rods imported, certainly not less than 140,000 tons, swelling the total apparent consumption to about 1,300,000 net tons.

Mr. Swank has obtained details showing the total production of rolled steel in 1887, exclusive of rails, making it 902,156 net tons, consisting of 174,465 tons of steel nail plate, 198,702 net tons of other steel plates and sheets, and 528,989 tons of

other rolled steel. The latter may not include wire rods, whether rolled from domestic or foreign billets, since we find, for instance, that New England is credited only with 8438 net tons, which would certainly be only a fraction of the output of our leading wire mills in that section.

Mr. Swank makes the interesting statement that in 1887 the grand total of steel rolled into all forms in the United States was 3,275,491 net tons, which was 686,991 tons larger than that of rolled iron in the same year.

When we turn to consumption the figures are more striking still. We produced and imported in all 2,527,484 net tons of steel rails. Adding thereto the 1,300,000 tons computed in the above the total would be 3,827,484 net tons. Adding to the iron rolled here the rolled iron in different forms imported we reach a total of about 2,700,000. Leaving out of account the consumption of tin plates this country showed an apparent consumption in 1887 of about 3,800,000 net tons of rolled steel in different forms, exclusive of crucible steel, against 2,700,000 tons of rolled iron, figures which no country in the world can approach.

The strike of the engineers and firemen on the Chicago, Burlington and Quincy Railroad is dead. It has been so for some time, but the strikers refused to acknowledge the fact. A post mortem could have been held with propriety six weeks since, but for some reason the leaders of the strike have been very reluctant about letting the public know what they really thought of the case. On the 2d inst., however, Chairman Hoge, of the grievance committee, of the C. B. and Q. branch of the Brotherhood of Locomotive Engineers, admitted defeat and stated that the official announcement would shortly be made. Including that day the strike lasted just 63 days, or nine weeks. Every means was tried to win victory, but the company were too strong, and finally the Brotherhood exhausted their resources and suffered their first defeat since 1877. It was a costly struggle. The loss of the railroad company is estimated at \$1,500,000, while the cost to the men up to this time is put at nearly \$750,000. The company are in good condition now, and in time will recover completely from their losses, while the strikers, or very many of them, are out of employment with no certainty of soon obtaining any. The strike cost four lives directly, and perhaps others indirectly. The men who lost their lives were all strikers, but over 50 of the new men have been beaten and disabled, and some have become helpless cripples. The end of all, however, is the defeat of what will be known in the history of American labor troubles as the great Burlington strike. It is unfortunate for the cause of labor that it was inaugurated. The Brotherhood of Locomotive Engineers had been regarded for years as the model labor organization. It was managed wisely and conservatively, and accomplished its purposes without resorting to strikes. So great had become the prestige of the organization through its remarkable success in carefully guarding the interests of its members at all points, that it was looked upon as invincible. It had no need to declare a strike, as that mode of warfare was only the resort of weak organizations whose power was

not respected. The result of the Burlington struggle has ruined the work of years, and very careful management is needed now to restore the Brotherhood to its once proud position among both employers and employed.

Blast Furnaces on May 1.

The table given below shows, on the whole, very few changes so far as the capacity of Anthracite furnaces in blast is concerned. The changes have been few and unimportant, the blowing out of a few furnaces being more than compensated for by the resumption of work on the part of somewhat larger stacks. The status of the anthracite furnaces in blast on May 1 was as under:

Anthracite Furnaces in Blast May 1.

Location of furnaces.	Total number of stacks.	Number of furnaces in blast.	Capacity per week.	Number of furnaces out of blast.	Capacity per week.
New York.	50	11	2,770	18	5,194
New Jersey.	15	5	1,465	10	3,125
Spiegel.	3	2	159	1	63
Pennsylvania :					
Lehigh Valley.	48	28	8,812	20	5,608
Spiegel.	1	0	0	1	40
Schuylkill Valley.	41	20	6,439	21	5,420
L. Susquehan. Val.	21	11	5,136	13	2,582
Lebanon Valley.	15	10	3,940	5	3,050
U. Susquehan. Val.	18	9	2,782	9	1,610
Maryland.	4	0	0	4	882
Total.	198	96	31,008	102	27,484

	Furnaces in blast.	Capacity per week.
May 1, 1888.	96	31,008
April 1.	94	30,496
March 1.	98	28,598
February 1.	97	29,989
January 1.	118	38,206
December 1, 1887.	122	39,487
November 1.	124	40,028
October 1.	123	39,440
September 1.	125	38,338
August 1.	120	37,920
July 1.	128	40,742
June 1.	128	44,188
May 1.	127	43,802

In New York and New Jersey there have been no changes whatever. In the Lehigh Valley the Crane Company have now four of their five furnaces in blast, while the Glendon are still running only one of their five. Carbon is out altogether, while the Thomas Company have blown out one furnace, but have resumed with another. In the Schuylkill Valley the output has been reduced by the blowing out of one of the Pioneer furnaces, but, on the other hand, Topton went into blast during the month. We referred in a previous issue to the excellent work being done by the Warwick Furnace. On the Lower Susquehanna the principal point of interest is the blowing in, during April, of a third furnace of the Pennsylvania Steel Company, but, on the other hand, the Robesonia, the largest furnace in the Lebanon Valley, has stopped for repairs. In the Upper Susquehanna Valley one of the Danville furnaces went in during April; otherwise there have been no changes. The product of the different districts, too, remains fairly stationary.

As will be seen, there has been an increase in the current capacity for the coke furnaces, due largely, however, to the resumption of work of stacks connected with steel rail mills. Among the latter the Edgar Thomson, Troy and Joliet are prominent. In the South the most marked increase likely to influence the general market for mill and foundry irons has been in Alabama.

Bituminous and Coke Furnaces in Blast
May 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York	3	1	900	2	1,800
Pennsylvania	20	13	12,475	7	6,875
Pittsburgh district	19	11	6,482	8	4,298
Shenango Valley	22	13	5,473	9	3,060
Juniata & Conemaugh	1	0	0	1	295
Spiegel	4	3	1,272	1	980
Youghiogheny Valley	3	2	1,120	1	580
Miscellaneous	2	0	0	2	340
Maryland	11	7	3,557	4	2,310
Virginia	6	4	2,304	2	1,880
West Virginia	4	3	791	1	300
Kentucky	17	10	7,021	5	3,628
Ohio	15	10	2,433	4	1,672
Mahoning Valley	15	7	1,620	8	1,815
Hanging Rock	17	10	6,906	7	5,443
Hocking Valley	15	10	10,888	5	7,430
Central and Northern	8	3	1,835	5	760
Illinois	15	10	654	2	1,370
Missouri	2	1	290	1	290
Indiana	1	0	0	1	290
Michigan	14	10	5,370	4	1,930
Tennessee	10	8	3,325	2	985
Georgia	2	2	780	0	0
Colorado	1	1	490	0	0
Total	212	130	75,815	82	45,911

	No. of furnaces.	Capacity per week.
May 1	130	75,815
April 1	128	70,644
March 1	128	68,892
February 1	135	73,912
January 1, 1888	143	88,101
December 1, 1887	144	88,885
November 1	151	90,459
October 1	152	89,123
September 1	145	88,194
August 1	118	62,091
July 1	98	47,319
June 1	98	44,865
May 1	148	88,500
April 1	148	81,796
March 1	140	79,682
February 1	145	79,257
January 1, 1887	137	73,429

The principal changes during the month have been in the Pittsburgh district. The Carrie Furnace was banked on the 27th ult. on account of the refusal of the men to accept a reduction of wages. It was, however, started up again on the 3d inst., so that in reality its position among the inactive furnaces was only accidental in the beginning of the month. Clinton and Soho furnaces are out, and Edith, which is still in blast, is to go out this month for relining and general repairs. Furnaces A, B, C and E, of Carnegie Bros. & Co., Limited, are now in blast. The first three named went in during the latter part of April, while E resumed operations on the 1st inst. Furnace A, usually employed in producing ferromanganese, is running on Bessemer pig, so that we have for the present placed it among the ranks of ordinary furnaces. In the Shenango Valley Mabel Furnace stopped operations, but, on the other hand, the second Stewart was added to the list of active furnaces. Since the beginning of the month the Fannie has again begun to blow. In the Juniata and Conemaugh valleys and on the Youghiogheny no changes of any consequence are reported. Among the furnaces which we class as miscellaneous we may note that Bellefonte, the new furnace of the Bellefonte Iron Company, is doing good work. In Virginia Crozer is again producing, but, on the other hand, Princess stopped work. Pulaski is running well, so that the total product of the State during April ran up to 15,875 tons, as compared with 14,061 tons in March. In West Virginia the same furnaces are at work, the aggregate output having been 9447 tons, as compared with 7450 tons the month previous. In Kentucky the two

Ashland and the Norton are producing, and Licking will be added during May. In the Mahoning Valley there have been no changes, the aggregate output being 30,107 tons. Nothing of any importance has occurred in the Hanging Rock region, where 10 furnaces produced 10,428 tons in April. The principal change among the furnaces grouped as those of Central and Northern Ohio has occurred in the stoppage of two of the furnaces of the Cleveland Rolling Mill Company, leaving only one in blast. The falling off in the product will be appreciated when we state that the April output was only 32,585 tons, as compared with an estimate of 42,383 tons in March. In Illinois ten furnaces are at work, with a product of 46,455 tons for April. In Missouri one of the Missouri furnaces was started up on the 12th of April, so that three are now producing in that State. In Alabama the principal event has been the blowing in of the first Ensley Furnace, which in 22 days made 3022 tons of iron, equal to a weekly product of over 1000 tons. Bibb Furnace has resumed after relining and enlarging. Eureka is making a somewhat larger output, owing to recent improvements. The Sheffield Furnace blew in on the 2d inst., and the DeBardeleben stacks are expected to make their first cast this month. We are, therefore, rapidly approaching the period when the long-promised increase in the output of Alabama furnaces will begin to be realized. Gadsden, another new furnace, may blow in in June, and the second Ensley is expected to begin operations at an early date. In Tennessee one of the South Pittsburgh furnaces is banked, while Citico went in on the 5th inst. In Georgia there has been no change.

Charcoal Furnaces in Blast May 1.

Location of furnaces.	Total number of furnaces.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England	14	5	410	9	680
New York	10	4	580	6	490
Pennsylvania	35	5	375	18	675
Maryland	13	2	182	11	750
Virginia	23	2	85	21	921
West Virginia	3	0	0	3	165
Ohio	18	4	350	14	1,130
Kentucky	1	0	0	2	215
North Carolina	1	1	90	1	80
Tennessee	9	4	970	5	1,080
Georgia	2	0	0	2	114
Alabama	10	8	1,449	2	410
Michigan	25	12	3,598	12	2,160
Minnesota	1	0	0	1	220
Missouri	4	1	260	3	710
Wisconsin	12	5	1,510	7	920
Texas	2	1	178	1	100
California	1	0	0	1	280
Washington Ter.	1	1	175	0	0
Oregon	1	0	0	1	125
Total	176	56	10,318	120	11,175

As compared with the previous month, there is an increase in the capacity running from 9629 tons to 10,418 tons weekly. In New England Kent has gone out, while in Pennsylvania Eagle and Pine Grove are again running, Hecla having blown out on the 27th ult. In Virginia Foster's Falls began working on the 28th, and Reed Island and Speedwell will probably be working before our report reaches our readers. In Kentucky Hunnewell is expected to resume during the month, while in Ohio Jefferson is again blowing, and Scioto and Pine Grove have resumed since the 1st. The date set for Mt. Vernon was the 16th. In Michigan

Elk Rapids started on the 30th, while Gogebic has gone out. In Wisconsin Hinkle furnace at Ashland made its first cast during the month. In Missouri Sligo blew out on the 12th, and it will not resume so long as business is in the present unsatisfactory condition and tariff legislation is being agitated. In Tennessee La Grange resumed on the 15th. The new furnace at Nashville will probably begin work during the current month. In Alabama Gadsden worked during a part of April, Tecumseh has stopped for repairs, and one of the two Woodstock furnaces has been out for repairs during a part of the month. The product of April was only 6220 tons, as compared with 6611 tons in March.

The Metal Situation.

The collapse in tin last week was as sudden as the withdrawal of support in cornering operations generally produces. On the whole the distributing trade in this country and the speculative element both have withstood the shock admirably. The former made a somewhat feeble effort to resist a sudden drop by an attempt to hold prices at a higher level without supporting the metal by giving a few buying orders for spot. The latter, last Wednesday, tried to keep disasters threatened at bay by stopping the calls at the Metal Exchange, a course which the far-sighted majority in that institution pretty effectually put a stop to. So far as the interests of manufacturers and the trade in this country are concerned, the most serious effect which the collapse in tin has had was the creation of a feeling of uncertainty as to the future in copper. Very large contracts with all classes of consumers were pending. The negotiations were naturally embarrassed by the end of a deal in which the same speculators were known to be engaged. It is a question which from the standpoint of a copper manufacturer possesses an interest beyond mere idle curiosity whether or not the syndicate suffered a serious loss. The manipulation in copper depends primarily upon the possession of enormous resources. No one who has studied the questions affecting the demand and supply for the metal for a moment believes that the present high prices on both sides of the Atlantic can be maintained indefinitely. With money enough to take all that is tendered a syndicate may hold to present prices for a long time to come, but the end of such resources must ultimately be reached. Is the collapse of the tin deal an indication that even the confessedly enormous capital of the French syndicate is proving inadequate to carry out its undertakings? Are American consumers to be those to whom the speculators look first to furnish them with profits enough to hold up the markets abroad? Let it be assumed that the reports are correct that the pool sale, made under the auspices of the syndicate, fixes 16 $\frac{1}{4}$ cents as the price for Lake, with a differential for other brands, making the aggregate, say, 16 cents on an average consumption of 8,000,000 pounds a month. This would give the syndicate a profit of, say, 1.5 cents a pound, or \$120,000 a month. If it choose it might extort a much larger figure. Practically producers and through them consumers are in its hands. Our market has been kept bare

of supplies and there is nothing to hinder a continuance of that policy. During the period of resistance to an advance our manufacturers have exhausted their supplies of raw material and of scrap. When copper was cheap, say 10 to 12 cents, they were carrying a larger stock than ever before. They have drawn upon it till now, but the end of that has come or is very near. Whatever may be the position in Europe it is statistically sound here and for the time being the consumers are at the mercy of the manipulators. Whether it will be so six months or a year hence is quite another matter.

Somewhat different views are urged by those who regard the operations of the syndicate with the approval which grows out of a participation in the good things brought to a few by its operations. They argue that this country at large benefits by the deal, and fortify their position by the following figuring: In 1888 the United States will produce at least 190,000,000 and possibly 200,000,000 pounds. The consumption is 100,000,000 pounds on which the syndicate makes a profit of \$1,500,000. The export must therefore be at least 90,000,000 pounds. Were it not for the French deal we could not hope to get from European consumers more than 11 cents a pound—if as much. Therefore, the country at large is \$4,500,000 better off on its export copper, leaving a balance in our favor of \$3,000,000 for 1888. Besides this, the profits of the mining companies remain in this country, and they may be roughly placed at 2.5 cents a pound, equivalent to \$2,500,000, the benefit derived by the United States at large is, therefore, figured at \$7,000,000, minus the profit of the syndicate, which leaves us with a balance of \$5,500,000. This money, it is urged, remains in the country. On the other hand, however, it is evidently forgotten that the copper consumers in the country are paying the piper, a fact which some of those who stand nearest to them, the manufacturers of copper and brass, do not regard with equanimity.

Senator Frye on Monday introduced in the form of a bill the amendment heretofore proposed by him to the Post-Office Appropriation bill to provide more efficient mail service between the United States and Central and South America and the West Indies. The amount of money to be appropriated, however, is increased from \$400,000, as originally proposed, to \$1,000,000. The bill authorizes the Postmaster-General to contract with American built and registered steamships for the transportation of the United States mails to ports in the countries named, these contracts to be at a compensation not to exceed 1 cent for each 450 grams weight on letters and $\frac{1}{10}$ cent for each 450 grams weight on papers for each nautical mile transported on the outward trip.

The River and Harbor bill was passed in Congress on Monday, under a suspension of the rules. The appropriation for Butter-milk Channel was increased from \$30,000 to \$100,000, and that for Gowanus Bay from \$10,000 to \$20,000. To compensate for this the appropriation for Harlem River was cut down from \$150,000 to \$70,000. Other appropriations not changed are as follows: New York harbor, \$380,000; East River and Hell Gate, \$250,000; Staten Island Channel, \$150,000.

CORRESPONDENCE.

AMERICAN WIRE ROD MILLS.

CHICAGO, May 4, 1888.

To the Editor of the Iron Age: Having read with a great deal of interest the article entitled "An Importer's Argument" in your issue of the 26th ult., and your able criticism on the same, I note the regret you express that you have not accurate statistics of the production of the wire rod mills in this country. I am in a position to aid you in putting forward some statements which at least partially supply the information the public generally does not possess. I will first give you the productive capacity of all the principal wire rod mills in the country:

	Annual capacity.	Gross tons.
Cleveland Rolling Mill Company, Cleveland, Ohio, 3 rod mills (1 Garrett)....	40,000	
Cambria Iron and Steel Company, Johnstown, Pa., 2 rod mills.....	32,000	
Washburn & Moen Mfg. Company, Worcester, Mass., 4 rod mills (estimated capacity).....	50,000	
J. A. Roebling's Sons Company, Trenton, Mass., 1 rod mill.....	12,000	
Cooper & Hewitt Company, Trenton, N. J., 1 rod mill.....	12,000	
Oliver & Roberts Wire Company, Pittsburgh, Pa., 1 Garrett rod mill.....	20,000	
Braddock Wire Company, Braddock, Pa., 1 Garrett rod mill.....	20,000	
Hartman Steel Company, Beaver Falls, Pa., 1 Garrett rod mill.....	20,000	
American Wire Company, Cleveland, Ohio, 1 Garrett rod mill.....	20,000	
Joliet Steel Company, Joliet, Ill., 1 Garrett rod mill.....	20,000	
Total.....	246,000	

In connection with these figures the fact should be specially mentioned, that developments during the past six months have proven a marked increase in the output of the Garrett mills.

In the past six years \$720,000 have been spent in constructing and building rod mills alone, not to speak of the investments made in Bessemer plant to supply them with raw material. An important fact in connection with the subject is that during 1887 there has been a marked increase in the quantity of American rods sold in the open market. During that year Oliver & Roberts, the Cleveland Rolling Mill and the American Wire Company sold rods in the open market, and they are now making rods for sale, since all of them produce a larger quantity than they need for their own wire mills. The Joliet Steel Company, whose mill is now being built, will sell the entire product of their new train, since they have no wire mill of their own.

One important statement which should not be allowed to go uncontradicted is that made by the importer you quote, to the effect that German and Belgian basic steel has been found better adapted than the Bessemer steel product in this country for wire mill purposes. Basic steel does not roll so well into rods as the acid Bessemer made in this country, owing to the lack of uniformity of the former. It has bad ends, splits in rolling, wastes more in heating, and I know of cases where from \$1 to \$2 a ton more has been paid for domestic Bessemer than for imported basic 4-inch billets or blooms. While in drawing basic steel is softer than acid Bessemer, and at first sight is thought to be better steel, owing to the greater tensile strength of the latter, there is less scrap in the wire mill, on account of lessened breakage of wire.

In connection with this subject let me call your attention to the ruling of Section 183 on wire rods. When the duty was placed at $\frac{1}{10}$ cent on wire rods not lighter than No. 5 gauge it was not thought practicable to roll rods less than that, hence it was thought that it covered the whole ground. As a raw material for subsequent manufacture, a No. 5 and a No. 6 rod are

exactly and precisely alike for the purpose they are now mainly used—that is, for fence wire and for wire nails, and if both sizes were made in this country not a cent more could be obtained for No. 6 than is now received for No. 5, as both sizes are drawn the same number of times to No. 12, and are cleaned, coated and annealed the same. Such being the case, it is difficult to understand what reasons there can exist for charging duty of \$11 per ton on the one and \$13.44 on the other.

The country is indebted for the cheap rods we have now not to the competition of foreign manufacturers, but to the pluck and enterprise of American producers. It may well be asked what improvement there has been in wire rolling in Germany and Belgium during the last six years. Emphatically the answer must be, none. Rods are cheaper now than they were six years ago, because the foreign manufacturers have squeezed labor there.

On the other hand, the record of improvement here is admirable. Six years ago the size of the billet used was 1½-inch square, weighing from 50 to 60 pounds; to produce this billet the Bessemer ingot was first bloomed to a 7-inch bloom; the latter was taken to a billet mill, heated and rolled into a 1½-inch square. The latter was then cut to weigh as stated above, and taken to a rod mill to be rolled into No. 5 rods. Fifteen tons a day was the average capacity, and 65,000 pounds was the largest output in 12 hours at one time. Now the ingot is rolled into a 4-inch bloom or billet, cut to length weighing 135 pounds, and rolled in the rod mill direct to a No. 5 rod. The average capacity per single turn under these circumstances is 50 gross tons, and 75 gross tons have been rolled in 11 hours. Such has been the record of American progress in a thriving industry which has been carefully nursed and fostered under adverse circumstances. If let alone for five years longer it will increase to such proportions that we need not import a single wire rod, but do a large exporting trade in that line, which will result chiefly to the advantage of the seaboard States.

The statement given above for the tonnage of the rod mills relates to their capacity. It is what could be done were every mill to work the full year around. Owing to the high price of steel rails in the early part of 1887 the cost of pig iron, and naturally the cost of 4-inch billets, was higher than they are now by from \$3 to \$4 a ton. The result was that mills not using the 4-inch bloom or billet could not compete with foreign rod mills, therefore all the mills did not work up to their full capacity, and, as you are, no doubt, aware 149,000 tons of wire rods were imported last year. It is my conviction that if the tariff on wire rods were to remain as per Section 180—that is, \$13.44 per ton—in five years from now this country would make 400,000 tons of rods per year and that the remarkable increase in the popularity of the wire nails, combined with the continued heavy requirements for barb fencing, would furnish a solution to the question where a market can be found for the large product mentioned in the above.

ROD MILL.

A press dispatch from Ishpeming, Mich., under date of the 4th inst., says: "The Saginaw Mine, which has been idle for four years, has been leased by a syndicate of Detroit capitalists and will be at once actively worked. At Mitchell Mine 100 men have been laid off and one shaft only is being worked owing to the failure to make sales of ore at Cleveland."

Walking delegates representing coal shovelers and ore handlers at some of the lake shipping ports are again making trouble.

The Mechanical Engineers.

Meeting at Nashville.

The Nashville meeting of the American Society of Mechanical Engineers was opened on Tuesday, May 8, Mr. Horace See being in the chair. Contrary to the usual custom, there was no address from the president, and the proceedings were opened by H. R. Towne, of New York, with a paper entitled

A SAFETY CAR-HEATING SYSTEM.

In this paper Mr. Towne described a system which has at this time passed into the control of the Safety Car Heating and Lighting Company, of New York. The system contemplates the retention of the well-known Baker heater, or its equivalent, and the use of hot water for the local circulating medium within each car, although modifications of the system are claimed to adapt it equally well to the Spear stove, or to any other apparatus having a hot-air circulation. The description given, however, was confined to the system as applied to a hot-water apparatus. In using the ordinary Baker stove the ordinary fire-grate is retained, and within the combustion chamber above it is the usual heating coil containing the circulating medium, which is preferably ordinary water, salted sufficiently to prevent it from freezing. The heater possesses three functions, capable of independent or simultaneous operation—viz., the heating of the water of circulation by means of steam from the locomotive; the heating of the same circulating medium by the combustion of gas fuel within the combustion chamber, or the heating of the same circulating medium by the combustion of solid fuel of any kind in the combustion chamber C.

The effect of heat applied by any of these three methods to the circulating medium is identical. One or more gas-storage tanks are provided under each car, within which gas, compressed to ten atmospheres or more, is stored for use, both for lighting and as an emergency fuel. The normal method of heating each of the cars is by means of steam taken from the locomotive and imparting its heat, in a "transfer chamber," to the water constituting the local circulating medium of each car. During periods of temporary separation from the locomotive the temperature in the car can be easily maintained by resorting to the use of gas fuel, which can be instantly ignited and as easily and quickly extinguished whenever the car is again coupled into a train. Finally, to meet the case of an emergency in which the car is isolated from its locomotive, or the latter is without steam and in which the supply of gas fuel has been exhausted, there remains the ordinary fire-box and combustion chamber, in which solid fuel of any kind, either coal or wood, can be utilized.

The paper was briefly discussed by Messrs. Hutton, Gobeille, Minot and Kent, and was followed by Mr. W. J. Baldwin with

NOTES ON WARMING RAILROAD CARS BY STEAM.

Mr. Baldwin presented a brief record of a series of experiments which he had conducted on the Long Island Railroad for determining the probable amount of steam required for the warming of a train or car, and also to ascertain the length of time one of Gold's storage car heaters would maintain the heat of a car after steam was shut off or the car side-tracked and the locomotive removed. The storage heater consists of a 5-inch boiler tube of any required length (18 or 20 feet), with a cap on each end. In this is placed eccentrically a similar 4½-inch tube with welded

end seven-eights filled with water and a solution of common salt. A block of iron holds the inner cylinder against the internal top of the outer one. The whole is mounted on a cast-iron stand fastened to the car floor and is furnished with a curved shield and foot guard. In operation steam is admitted to the space between the two eccentric tubes the same as to any radiator. When the steam is on for a sufficient time the water in the inner cylinder becomes practically as hot as the steam itself, and remains so until the supply of steam is cut off, when it begins to give off its heat by radiation, &c., to the walls of the outer cylinder. Mr. Baldwin concluded from his experiments that 2 square feet of surface per running foot of car is more than ample for warming, and that each square foot of surface requires heat equivalent to about 2 heat units for each degree the air is colder than the heater.

Mr. Baldwin's paper did not bring out any remarks and the meeting proceeded to consider two papers by Mr. John T. Hawkins. The first one referred to

THE PRINTING PRESS IN MECHANICAL ENGINEERING SCHOOLS.

In this paper Mr. Hawkins referred to the apparent lack of attention with which the printing press has thus far been regarded in schools of mechanical engineering. Considering the prominent institutions, such as Stevens, the Massachusetts Institute, and Cornell, Mr. Hawkins remarked:

Among the list of graduates for mechanical engineers from 1869 to 1887 there is not a single mention of one in any way connected with printing machinery. The printing machine of to-day certainly deserves a higher place in our schools, as a specialty in applied mechanics, than is indicated by the foregoing; and it may reasonably be assumed that such a total absence of anything like attention to this branch of the mechanic arts in the school courses accounts for the rather astonishing fact that, in the long list of graduates from the schools mentioned, but one appears as having entered this field, even in the remotest connection. The writer feels—and his experience sustains him in it—that the printing press has received too little special consideration or study at the hands of our professors and instructors in mechanical engineering, and that, with greater attention given, and more importance attached to it, they would be likely to open up an extensive field which the graduate may profitably enter, and from which he is now in a great degree excluded, for the reason that the printing press, as one of the most prominent specialties in mechanical engineering, is given little, if any, more attention at school than is involved in the study of the more abstract subjects which he may subsequently apply to it, if opportunity offers.

In the course of the discussion on this paper Mr. William Kent called attention to the fact that our literature does not possess adequate text books, and emphasized their importance. Messrs. Hutton, Magruder, Reese, See and Sweet agreed, in the main, with Mr. Kent's views. Written remarks were then submitted by Messrs. Dingee and West, on the papers of Fowler and Hawkins. Mr. Fowler's paper, entitled, "Estimating the Cost of Foundry Work," we will present in an early issue.

Mr. Hawkins' second paper was entitled: *AUTOMATIC REGULATOR FOR HEATING APPARATUS.*

After pointing out the defects of the present common methods of temperature regulation, Mr. Hawkins described an apparatus calculated to avoid these. Engravings were presented showing the main features of the device, which may be substantially described as follows:

Surrounding the return-pipe from the radiator delivering the cooled water into the lower part of the boiler is a helical-coil thermostat, constituted of two strips of dissimilar metals, having widely different coefficients of expansion, as brass and iron, riveted, soldered or brazed together. This helical thermostat fits over the pipe easily, with the more expandable metal on the inside, and the less expandable on the outside exposed to the temperature of the surrounding air. The lower end of the helix is secured to a lever having in one arm an arch of pin-holes, the outer arm constituting the handles. A lug is attached to the heater, having the single hole meeting the arc of holes mentioned. A pin may be placed in either of the holes in the arc, and thus the lever be rigidly held in either position determined by the given hole used. The helix having the more expandable metal exposed to the fluctuations of the temperature of the pipe within it, while the less expandable one is in contact with the surrounding air, and therefore only partially heated by conduction from the inner one, will undergo a considerably greater straightening or unwinding for a given elevation of temperature of the pipe within it than if it were merely immersed wholly in the medium whose variation of temperature was to operate upon it, as with the ordinary thermostat, and the lower end of the helix being fixed, and the helix being of considerable length, such a straightening or unwinding by elevation or coiling up by reduction of temperature of the pipe will cause an upper lever to move through a considerable arc for a small variation in temperature of the pipe within it, and the force exerted to move this lever will be a very positive one. This upper lever is connected by a series of levers with the damper. By means of the perforated arc referred to any desired adjustment may be secured. The apparatus is quite as applicable to the government of hot-air furnaces as to hot water by providing a special small branch hot-air flue to be surrounded by the helical thermostat, and the necessary connections made for the dampers.

This paper led to an active interchange of views, in which Messrs. Dent, Kent, Warner, Gobeille and Minot participated. Mr. G. H. Babcock submitted remarks in writing in accordance with the practice of the society. The discussion turned chiefly on the relative merits of water and steam.

Mr. Henry Leon Binnse followed with a paper describing "A Short way to Keep Time and Cost," devised by Mr. Arthur J. Frith. In its essence, it consists in an analysis of the time, made by the time keeper at the moment when he takes it from the man, so that the time book becomes a complete record of every man's work, of the cost of the contracts, of the total number of men at work on each contract and of the wages paid. In new work which is not to be duplicated the exact cost of each item is seldom required. You need the total cost of the work and that of its principal subdivisions. Mr. Binnse presented a chart illustrating his remarks. For every man's name on the left side of the sheet there are six horizontal lines, one line for each working day of the week. The kind of work, whether slotting, vise, drilling or whatever it may be, is noted in the first square to the right of these names. Then come the contracts with their leading subheads, the various "specials" being still further to the right. The wages paid are shown at the extreme right. The time keeper, on his rounds, decides once for all to which subdivision the work belongs, enters the time in its square, and there is no copying to be done. At the end of the week the hours each man has spent on each subhead are summed up and their value in money entered on a separate sheet, where the cost and weight of the raw ma-

terials are kept. There was a written discussion of this paper.

In the matter of topical discussions the following two queries were taken up. "What is the most economical speed of cables in telen-dynamic transmissions for high and low power?" and, "What data have you for design of hemp rope transmissions, especially where several flat parallel ropes replace a flat belt?" Illustrated written discussions were presented by Messrs. John H. Cooper and W. W. Dingee, remarks being made also by Messrs. Supplee, Minot, Lanphear, Warner and Parsons. The main points considered were splices and the relative value of long and short splices.

A visit was made to Fisk University, and also to West Nashville, where the new plant of the Nashville Iron, Steel and Charcoal Company was inspected. Mr. Willard Warner, the president and general manager, delivered a speech of welcome, and then gave way to Dr. H. M. Pierce, who explained the process of making charcoal with recovery of by-products of which he is the inventor. The two furnaces are completed, the intention being to run one on charcoal and the other on coke. They are both 12 x 60 feet, and are equipped each with two Gordon-Whitwell hot-blast stoves 16 x 55 feet, with an estimated capacity of 60 tons per day. The charcoal furnace is to be started in a few days, while the coke stack will be blown in at a later date. The plant comprises 42 Pierce charcoal kilns, with the necessary equipment to save the by-products of the distillation of wood.

The evening session was concluded by speeches by Professor Thurston, Messrs. See, Woodward and others, the topic being "The Coming Engineer."

Among recently authorized corporations in Illinois are the following: Cinnabar Mining Company, at Highland, Madison County; capital, \$200,000; incorporators, John Blattner, H. G. Gleyre and J. S. Hoerner. The Central Hardware Company, at Chicago; capital, \$50,000; for the manufacture of plated goods; incorporators, W. P. Woods, H. H. Murray and C. P. Krus. The Illinois Automatic Gas Company, at Chicago; capital, \$400,000; for the manufacture of automatic machines for the making of gas; incorporators, Charles W. Jenks, J. W. Merriam and John H. Whipple. The American Fire-Proof Steel Car Company, at Chicago; capital, \$1,500,000; for the manufacture of all kinds of railway cars and rolling stock; incorporators, William W. Green, James Murison and John C. Bailey. The Western Construction Company, of Chicago; capital \$10,000; for the construction of street railways, &c.; incorporators, James R. Smith, John S. Gregory and Charles R. Anderson. R. F. Brown & Taylor Heating Company, at Chicago; capital, \$16,000, for the construction of water heaters, furnaces, &c.; incorporators, George R. Daley, Charles H. Talbot and John H. Batten, Jr.

The Northwestern Wire Mattress Company, of Kenosha, Wis., are erecting a two-story brick building, 100 x 100 feet, and are also putting in a Hamilton-Corliss engine 18 x 42 inches. The capacity of their works when these facilities are added will be not less than 1000 woven wire mattresses per day of ten hours.

William Ward, of Niles, Ohio, a well-known iron manufacturer, has been appointed superintendent of the mills of the Hubbard Iron Company, at Hubbard, O.

It is reported that New York and Connecticut capitalists are to erect a copper smelting and refining plant at Milford, Conn.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, PA., May 8, 1888.

Pig Iron.—The market has a steadier appearance, although it cannot be called better than it was a week ago. It is steadier, because sellers, finding only a limited demand, have in a measure ceased urging consumers to buy, perceiving that such a course only weakens the market without increasing the volume of business.

The chances are, therefore, that the market has a good bottom for the present, although it is not unlikely that weak spots could be found if buyers of good-sized lots were to look for them. But as no such parties present themselves, the market, by common consent, is allowed to remain where it is until something new turns up. The natural inquiry is, What are the ruling prices to-day? The answer cannot be very satisfactory, because there are many Irons and nearly as many prices. What one would be glad to accept another might consider almost beneath serious notice. In a general way, however, good fair Irons, equal in quality to standard brands, can be had at \$19 @ \$19.50 at tide for No. 1 Foundry, and \$16 @ 16.50 for Gray Forge; while a few extra quality brands command \$20 @ 20.50 and \$17 @ 18 respectively. But there is no disguising the fact that holders are very nervous, and the opinion that prices are going lower is steadily developing. There may be a pause in the reaction, but the outlook is not encouraging to those who look for improvement. Producers claim that they cannot possibly make cheaper iron, and although it would be cause for profound regret if they had to do it, it must not be forgotten that they did it in 1878 and in 1879, when there was no such thing as Southern competition. Quotations at that time were \$15 for Gray Forge, \$16 for No. 2 Foundry, and \$17 for No. 1 Foundry; tidewater deliveries same as in the present instance. If then, why not now under such a stimulus as is furnished by outside competition? Furnaces are doing far better work than they did ten years ago, and, if the iron masters profits (?) are less or their losses greater, it must be either that fuel, freights, Ores or labor are more costly or in a combination of the whole. It is claimed that the difference is pretty evenly distributed, and, while it is a matter of sincere regret that these various interests should be called on to suffer, it is not unreasonable to demand that they take an equitable share of the burden, which, of course, will, in any case, be but temporary. Sooner or later it will have to be done, and the sooner the better—on the principle that an ounce of prevention is better than a pound of cure. Our mills and furnaces have been steadily losing trade for months past, because of their inability to meet Southern and Western competition. It would be far better to make reductions that would at least keep the machinery of trade in motion than to see business connections broken up and placed in the hands of parties at a distance. Prompt action is necessary, as the case is serious. It would be difficult to estimate with any degree of accuracy the amount of Southern Iron sold in this market since the beginning of the year. Ten to fifteen thousand tons is probably not far astray, and possibly nearly the same of Western Iron. If to this we add the large amount of finished material sent here by Western competitors, it will be readily seen that the loss is very far-reaching. Four tons of freight may be figured for each ton of Pig Iron, and still more for Finished Iron,

besides the employment furnished at mining, furnaces and other incidentals, giving a means of living to thousands directly and indirectly. The reductions recently made in the items under consideration were discounted some time ago, and further concessions are urgently required to enable the trade to maintain their position. Southern Irons are not offered to any extent at present, although it is by no means certain that they are entirely withdrawn. Nominal rates are \$16, \$17 and \$18 ex-ship, which figures could probably be shaded if there was any demand, but there is no appearance of interest in them at present.

Foreign Iron.—There is nothing doing at present, and bids for large lots are not readily obtained. Nominal prices are \$19.50 @ \$20 for Bessemer and \$26.50 @ \$27 for 20% Spiegel, with no recent transactions.

Blooms.—There is a fair business in Steel Blooms at quoted rates, chiefly domestic, foreign being too high to permit of business at present. A sale of 2000 tons Nail Slabs is reported at \$29.50 f.o.b. cars at mill in Eastern Pennsylvania. Prices about as follows in ordinary cases, say, Foreign, at tide, c.i.f., duty paid, \$30 @ \$31 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c. Domestic Blooms: Steel, from \$30 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$44 @ \$45; Scrap Blooms, \$36 @ \$38 per "bloom" ton of 2464 lb.

Muck Bars.—The market is extremely dull and prices somewhat easier, especially for inferior qualities. Some of the best makes are held at \$28.50 @ \$29 at mill, but there are others quoted at \$27.50 @ \$28. It is largely a matter of quality, location of mill, &c.

Bar Iron.—There is a little more business offering, but prices are still weak, and on average transactions are probably a trifle lower. Buyers of good-sized lots talk 1.75¢ as the figure at which they can place orders, but some of the best mills in the vicinity are holding for 1.85¢ @ 1.9¢, and seem to keep pretty well employed. It is considered somewhat doubtful, however, whether the quality of these low-priced Irons would stand a very close scrutiny, but in the meantime many parties seem to take the risks. There is a great deal more inquiry for Skelp Iron, and if orders are in proportion to inquiries the mills will soon receive some valuable business. But bids are at such low figures that only very small lots have been taken so far, although it is hoped with cheaper Pig Iron, fuel, &c., they may be in a position to meet competition from outside points. Sales have been made at from 1.8¢ to 1.82¢, but buyers talk about 1.75¢ for 1000-ton lots.

Plate and Tank Iron.—The market does not show much activity, although there is a little more inquiry, and prospects of several good orders being placed in course of a few days. Prices are no better, however, and competition is so close that the chances for improvement are not encouraging. Quotations cannot be given with much exactness, as they depend to a great extent on the size of order, time of delivery, &c., as well as on the conditions of the order books of those making the bids. In ordinary cases quotations are about as follows: Ordinary Plate, 1.95¢ @ 2.05¢; Tank, 2¢ @ 2.10¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3.1¢; Fire-Box, 3.1¢ @ 4.1¢.

Structural Iron.—There is very little new business coming in, and the feeling among manufacturers is somewhat despondent. A great deal of new business is talked about, and will probably be placed before long, but in the meantime mills are getting short of work in some of their departments, and are anxious for something to fill up with, hence feverishness and uncertainty. Prices nominally as follows: 2.10¢ @ 2.15¢ for Bridge Plate; 2.05¢ @ 2.10¢ for Angles; 2.7¢ @ 2.8¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The market is dull, and in many cases prices are a shade easier. There is an improved demand in some quarters, but large orders can only be obtained by making concessions. Small lots of the best makes are quoted as follows:

Best Refined, Nos. 26, 27 and 28.....	3½ @ 3½¢
Best Refined, Nos. 18 to 25.....	3 @ 3½¢
Common, 1/4¢ less than the above.	
Best Bloom Sheets, Nos. 26 to 28.....	4½ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25.....	4 @ 4½¢
Best Bloom Sheets, Nos. 16 to 21.....	3½ @ 3½¢
Blue Annealed.....	2.8 @ 3 ¢
Best Bloom, Galvanized, discount.....	60 ¢
Common, discount.....	65 ¢

Steel Rails.—The feeling in this department is a little uncertain and in many respects is less confident than it was a few weeks ago. Sales during the first four months of the year were in round numbers 800,000 tons (a little short of that), but the demand during the balance of the year is not likely to be very heavy. Mill are quoting \$31.50 @ 32, f.o.b. cars, but it is intimated that equal to \$31 has been accepted, although mills in this vicinity say that they have taken nothing below \$31.50. The tone of the market is very heavy, however, and it would cause no surprise to see prices a shade lower.

Old Rails.—There is no change whatever in this market. Stocks are light and held by strong parties, who quote \$22 for T's in store, while shipments are \$22.50 asked. There are bids of \$21.50 for spot lots, but, as they can be laid down from other points at about that figure, buyers are not prepared to advance their limits, for the present at all events.

Scrap Iron.—The market is extremely dull, and, to effect large sales, prices would have to be shaded. Nominal rates are about as follows: \$20.50 @ \$21 for shipments of cargo lots; \$21 @ \$22 for carload lots, delivered, or for choice \$22 @ \$23; No. 2 do., \$14 @ \$15; Turnings, \$14 @ \$15; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18. Philadelphia, or its equivalent.

Wrought-Iron Pipe.—A heavy demand has set in, so that manufacturers in this vicinity have enough work on their books to keep them busily employed during the next two months. Prices, however, continue weak and unsatisfactory. Discounts on small lots are quoted as follows: Black Butt-Welded, 50%; on Galvanized do., 45%; on Black Lap-Welded, 65%; on Galvanized do., 50%; Boiler Tubes, 60%.

Nails—Are very unsettled and inclined to weakness. The demand continues fairly good. Small lots are freely taken, but heavy buyers are not in the market at present. Small lots from store command from \$2 to \$2.10 per keg, with the usual concession on carload lots.

Chicago.

Office of *The Iron Age*, 96 and 97 Washington St.,
CHICAGO, May 7, 1888.

Pig Iron.—Business has been very dull during the past week, with no prospect of a change for the better in the near future. Some large consumers need a great deal of

Iron to cover work which they have recently taken, but they will probably bide their time and trust to the rivalry between sellers to furnish them with material as rapidly as they need it and at a lower average than if it were contracted for in a block. Lake Superior Charcoal is firmer in price than Coke Iron, but is not as firm as it has been, and it will probably descend to a lower level before the usual yearly contracts are made by large buyers. Quotations are difficult to make under existing circumstances, the gap between carload and 100-ton prices being wider than usual, while rumors are frequent of much lower prices than anything hitherto deemed possible. Usual quotations for small lots are as follows, for cash, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$20 @ \$20.50; Alabama Car-Wheel, \$26.50; Southern Charcoal Foundry, No. 1, \$18.50 @ \$19.50; Jackson County Softeners, No. 1, \$18.50 @ \$19; Hocking Valley, Soft Foundry, No. 1, \$18.50 @ \$19; American Scotch, No. 1, \$19.50 @ \$20; other Ohio Scotch Irons, No. 1, \$18 @ \$19; Lake Superior Coke, No. 1, \$18.50 @ \$19; No. 2, \$17 @ \$17.50; No. 3, \$16 @ \$16.50; Southern Coke, No. 2, \$17.50 @ \$18; No. 2½ and Open Bright, \$17; No. 3, \$16.50; No. 1 Mill, \$16; No. 2 Mill, \$15.75.

Bar Iron.—Orders for Car Iron are in the market to some extent, but the general demand is very light. An abundance of Iron can be had at 1.65¢, half extras, f.o.b. Chicago, by those who are not very particular as to quality, but the price for good Common Iron is still about 1.70¢. Store prices range from 1.80¢ to 2.10¢, according to quantity and quality, with occasional sales at a shade under the lowest rate to best customers.

Structural Iron.—Contracts for building material and bridge work are being held back, although it is known that a great deal of work will be done in this locality during the present season. The expectation now is that the demand will spring up late in the season, when everybody will desire deliveries as quickly as possible. The North Chicago Rolling Mill Company expect to start their North Chicago mill on Steel Beams next Monday. They will be able to furnish from 6 to 12 inch Beams at first, but will shortly make up to 15 inches. They will not make Channels or Angles at present. Store prices are as follows, according to quantity: Angles, 2.40¢ @ 2.70¢; Tees, 2.60¢ @ 2.90¢; Beams and Channels, 3.80¢. Mill prices for carload lots are as follows, f.o.b. Chicago: Angles, 2.25¢ @ 2.30¢; Universal Plates, 2.35¢; Tees, 2.55¢ @ 2.60¢; Beams, 3.40¢.

Sheet Iron.—Representatives of manufacturers report a quiet week, with prices for mill shipments ranging from 2.95¢ to 3¢, f.o.b. Chicago, for No. 27 Common Black. Jobbers still quote 3.30¢ from store for small lots of No. 27, but prices show a drooping tendency. The trade in Galvanized Iron has been quite fair, but the demand is not so heavy as that of the preceding week. The business transacted in April is reported to have been very much ahead of that of April of last year. The present demand for Galvanized Iron is well distributed among all classes of consumers. Prices continue about as previously quoted, with 60% off for Junta and 60% and 5% off for Charcoal named for small lots.

Plates, Tubes, &c.—The mills are somewhat stiffer in their views, but the sources of supply have widened by the entrance into this market of several Western mills which had for some time been closed or were out of the field for other reasons, so that it is not likely an advance can be established here. Dealers report a better demand during the past week, both from store and for mill shipments, than for the

weeks immediately preceding. A great deal of work is in sight and dealers are quoting on more new business every day. Store quotations are as follows: Heavy Sheets, Nos. 10 to 14, 2.70¢; Tank Iron, 2.60¢; Tank Steel, 2.75¢ @ 3¢; Shell Iron, 3¢; Shell Steel, 3¢ @ 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60¢ @ 62½% off on 2½-inch and larger, and 57½% off on 2-inch and smaller.

Merchant Steel.—A fair demand is in progress from manufacturing consumers, but no large orders have yet made their appearance. Store quotations are as follows: Bessemer Bars, 2.45¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.65¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

Steel Rails.—Manufacturers are reticent as to the character of new business recently taken, but there is reason to believe that orders amounting to a very considerable quantity in the aggregate have been taken by the several mills in the past week. Prices are still based on \$33 for Western business, but this quotation is shaded whenever competition renders it necessary.

Track Fastenings.—Demand and prices are very irregular, the largest buyers shopping persistently in the hope of getting the lowest prices going. Angle Bars are quoted at 1.90¢ @ 2¢, according to pattern and quality, but some makes can be had as low as 1.80¢. Track Bolts with hexagonal nuts are quoted at 2.80¢ for the best quality, but cheaper makes are plentiful. Spikes are firmer than other Track material, 2.10¢ being a rate on which most manufacturers have united.

Old Rails and Wheels.—Quite a number of transactions have recently taken place at \$20, delivered at Milwaukee, or \$19.50 here. Some holders are refusing to sell at this price, and are able to get from \$20.50 to \$21 for small quantities from consumers, who are purchasing supplies as they need them. Car-Wheels are quoted at \$19 @ \$19.50, but it is doubtful whether any considerable quantity could be secured at this price.

Scrap.—The large negotiations mentioned as pending last week have not yet been closed, but several small sales were made, so that the movement has not entirely ceased. Offerings of material continue to increase. Dealers are still paying \$12 for Mixed Country Scrap. Their selling quotations for carefully selected are as follows per ton of 2000 lb: Railroad Shop or No. 1 Forge, \$19 @ \$20; Track, \$17.50 @ \$18; No. 1 Mill, \$14 @ \$15; Light Wrought, \$8.50 @ \$10; Horseshoes, \$18.50; Axles, \$24 @ \$25; Machinery, Cast, \$14.50; Stove Plate, \$11 @ \$12; Cast Borings, \$9.50 @ \$10; Turnings, \$12; Axle Turnings, \$13 @ 13.50; Coil Steel, \$13; Leaf Steel, \$15; Locomotive Tires, \$16. Sales are made at lower prices than those for material which is not thoroughly assorted.

General Hardware.—A fair trade is in progress in Heavy Hardware, the demand being best for Wagon and Carriage stock. In Shelf Hardware business is less active than it has been. This is the time of the year for dull trade in this line, as farmers are now busy making preparations for putting in their crops. Recent rains have greatly encouraged agriculturists, and those having dealings with them are, therefore, anticipating a good trade as the season advances. Although no material changes have been made in prices, the tendency is downward in staple goods. Nails are weaker. Bolts, however, are holding their own very well. Pig Tin and Solder have fallen to correspond with

the drop in Eastern markets, but no other change has taken place in Tin products. Collections are fair.

Nails.—The movement is very sluggish, nobody buying more than is needed for immediate use, either of Cut or Wire Nails. Steel Cut Nails are quoted by jobbers at \$2.15 in small lots, and 10¢ less for car-loads. Wire Nails are sold at \$2.75 for small lots, and 10¢ less for carloads. The carload demand is very light.

Barb Wire.—The condition of this branch is better than that of Nails. The spring trade has been excellent, and most jobbers are now in the market to buy. They will hardly be able to place orders with the manufacturers within 10¢ @ 15¢ per 100 lb of the prices they paid last fall. The price to the country trade will consequently be about 3.25¢ for Painted and 4¢ for Galvanized, although small lots have recently been sold at about the price which jobbers would at that rate consider bottom for carloads. An important meeting of manufacturers was held in this city last week, particulars of which are promised for our next report.

Copper.—Some good contracts are now in sight, but the apprehension prevails that Copper may follow the course of Tin, and for the present buyers are disposed to wait.

F. K. Bowes, dealer in Railway Supplies, has removed to rooms 213 and 214 in the Phoenix Building, corner of Jackson and Clark streets.

The Larm Mfg. Company have removed their Harmless Spur Fencing factory from 84 market street to the Burton Building, corner of Clinton and Van Buren streets.

The Chicago Forge and Bolt Company have removed their general office from 234 South Clark street to room 701 in the Rookery Building.

A new stock sheet has just been issued by Joseph T. Ryerson & Son, of Chicago, showing the number of Iron and Steel Plates and Sheets in their warehouse, together with a full description of the size and quality of each, as well as the stock of other Boiler and Tank makers' supplies carried. It is printed in pamphlet form, pocket size.

Cleveland.

CLEVELAND, May 7, 1888.

Iron Ore.—A round lot of non-Bessemer Hematites, assaying 59 per cent. in Ore, was offered a prominent buyer this morning for \$3.75 per ton, and the sale is likely to occur before the close of the week. There is something of a demand for Ores of this grade at about the figures named. Although the facts are guarded with the greatest secrecy, sales of Gogebic Bessemer are known to have taken place at \$5 @ \$5.25, f.o.b. vessels at Lake Erie ports. Additional sales of Ore from the Lake Superior and Champion mines, in the Marquette Range, at \$6, f.o.b. vessels lower lake ports, have occurred, the total negotiations from three mines now amounting to about 200,000 tons. The Chapin Mine, in the Menominee Range, has several additional lots of Ore at \$5. The Brier Hill Iron and Coal Company, of Youngstown, are said to have bought the estimated output of three mines in this range at about \$5 per ton. Menominee Ores are now selling more freely than that of any other range, about 450,000 tons being reported sold up to date. About two-thirds of this amount has gone to interested parties. Sales of Republic Ore are still confined to small lots. Ore dealers and furnace men in Cleveland and the Mahoning and Shenango valleys are united in the belief that the present prices for Ores means a large curtailing in foreign impor-

tations. The vesselmen have come squarely down to the figures of the mine owners and the buyers. Additional charters are reported from Escanaba at 90¢, with a possibility of 85¢; from Marquette at \$1.10 and \$1.15, and from Ashland and Two Harbors at \$1.25. This schedule of lake freights, together with the reduction of wages at the mines, makes possible an average reduction of \$1 per ton over last season's quotations. An encouraging indication of larger sales of Ore than were anticipated two weeks ago is found in the fact that consumers of Soft Steel are contracting ahead—some of them to August 1. The active buying movement in the Ore market, which last year began on March 4, continued into April, has not really commenced. It is expected that 400,000 or 500,000 tons of Ore will be sold later in the week, several large contracts being pending.

Pig Iron.—There is no improvement in the market and but little to hope for unless the low prices for Ores should encourage buyers to offer living prices and ask for substantial amounts. Foundry Irons are in fair demand as compared with other brands, but a two-car load would be above the average transaction.

Nails.—Both Iron and Steel Nails are reported slightly weaker, the former being quoted at \$1.95 and the latter at \$2.05, from store. Steel Wire Nails are in fair request at card rates.

Barb Wire.—Not much business is being done, although prices are still \$3.85 for Galvanized and \$3.10 for Painted.

Manufactured Iron.—Only a small demand is reported. For Common Bar Iron \$1.65 has been offered and accepted for small lots.

(By Telegraph.)

The only new feature of the market is the sale of about 20,000 tons of non-Bessemer Ores assaying 60% for delivery at the mines at a price equal to \$4 in Cleveland. Furnacemen to-day report a considerably improved feeling in the market for Bessemer Pig Iron owing to additional orders for Rails and low prices for Ores.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, May 7, 1888.

Pig Iron.—The two prominent features of the local market for Pig Iron are dullness and weakness, but there is less pressure to sell, although the course of prices is still steadily downward to all intents and purposes. The buying is small and of a hand-to-mouth character; high-priced contracts are being canceled, and settlements are obtained from others only by making deductions. The consumers, as well as the producers, of Pig Iron are dubious, and reports are more of a discouraging nature than otherwise. The outlook for the Steel plants in the West is especially bad, and the concern at St. Louis is reported to have thrown up its lease. Sales made during the week have ranged from car lots to 1000-ton orders of Silvery Gray, Bright, Mottled and No. 1 and No. 2 Mill, within the range of quotations, but the 1000-ton orders are small. A large Southern company have consummated transactions for about 10,000 tons Mill Iron during the first three days of this month, entered into some time in April. A good demand is reported for Car-Wheel Iron, which is scarce and well sustained. Prices current here for cash, with further revision, are as follows:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$17.50 @ \$18.00
Southern Coke, No. 2.....	16.50 @ 17.00
Southern Coke, No. 3.....	16.00 @ 16.50
Ohio Soft Stone Coal, No. 1.....	17.00 @ 18.00

Ohio Soft Stone Coal, No. 2.....	16.50 @ 17.00
Mahoning and Shenango Valley...	17.00 @ 18.00
Hanging Rock Charcoal, No. 1...	20.50 @ 22.50
Hanging Rock Charcoal, No. 2...	19.00 @ 21.00
Tennessee and Alabama Charcoal,	
No. 1	18.50 @ 19.50
No. 2	17.00 @ 18.00
Forge.	
Strong Neutral Coke.....	14.00 @ 15.00
Mottled Neutral Coke.....	13.50 @ 14.00
No. 1 Mill Coke.....	14.75 @ 15.00
No. 2 Mill Coke.....	14.00 @ 14.50
Car-Wheel and Malleable Irons.	
Southern Car-Wheel	20.00 @ 22.00
Hanging Rock, Cold Blast.....	22.50 @ 25.00
Lake Superior Car-Wheel and Malleable	21.00 @ 22.00

Manufactured Iron.—The demand for all kinds of Manufactured Iron has been light, and an easy tone has prevailed, without change in the price current. Bar and Sheet Iron—Common Bar Iron, 1.90¢ @ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3.25¢ @ 4.25¢ per lb.

Nails.—The demand has been moderate and the market has remained easy at the recent decline, 10 to 60d Iron selling at \$2.05 per keg, and other sizes at proportionate rates. Steel sell at \$2.10 and Steel Wire at \$2.80 per keg.

Old Rails and Wheels.—An easy tone has continued to prevail for both Old Rails and Wheels, Rails being more freely offered at \$19 and Old Wheels difficult to sell at \$20 @ \$20.50 per ton.

Chattanooga.

Office of *The Iron Age*, Ninth and Carter Sts., CHATTANOOGA, TENN., May 7, 1888.

The business of the country is moving along about as usual, with scarcely any changes to note. There has been a sort of weeding out of many of the new enterprises of those that were inaugurated under the influences of the boom, but a very large number have come to stay, and have already commenced operations or are prosecuting their work with a view to early completion. Taking everything into consideration, there is no reason to look upon the business situation in any other light than a very encouraging one.

Pig Iron.—It is impossible to describe the true situation of this department of business. There has been a slight falling off in the total output of the Southern furnaces in the aggregate, in consequence of many of them being out for repairs. The question of a full supply of Coke is still with us, with no immediate remedy in view. So far, however, as the future output of Iron is concerned, there is no doubt but there will be a change. Several of the furnaces that were under repairs will go in, as well as some of the new ones, and it will not be many weeks before the South will be turning out more Iron than ever. The disposal of it, however, at good prices will depend almost entirely on the quality turned out, which there is every reason to believe will be better than heretofore. Prices are irregular, with no permanent basis to quote from. We note sales of small round lots, at prices ranging from \$14.50 to \$16.50 for No. 1 Foundry at the furnace, the difference depending partly upon the character of the Iron and the reputation of the furnace, and partly upon the character and disposition of the contracting parties. Among the conservative Iron producers of the South, the future is being looked upon with much interest and some concern. It is evident that prices are getting down to something like cost after freights are deducted, and many men in the Southern districts, who have put their money in furnace plants, would rather loan it at 3% than have it remain where it is. The foundries of the South generally are taking their usual amounts, and some who run largely on specialties are taking more than usual just now, to be ready for their fall trade.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth avenue, Pittsburgh, Pa., May 8, 1888.

The most important event of the past week was the winding up of the strike at Braddock. The Edgar Thomson Rail Mill and furnaces, after having been idle for over four months, will soon be in full blast again. As yet some departments are not operated fully, but it will not be long before the entire concern will be in full operation, and employment thereby afforded to some 3000 men, many of whom, owing to the protracted strike, are in needy circumstances. There is great rejoicing, not only at Braddock, but in this city and at adjacent points. The railroads made a reduction last week on Pig Iron freights from the Mahoning and Shenango Valley to Pittsburgh of 10¢ per ton, bringing the rate from 85¢ down to 75¢ per ton. Furnacemen expected a reduction of at least 20%, and are dissatisfied. The market is exceedingly depressed, and furnacemen think the railroads should be willing to stand their proportion of it. Moreover, there is reason to believe that a lower rate would cause an increased business which would more than offset the low rate.

Pig Iron.—The market continues in an unsettled, and, to producers, very unsatisfactory, condition. Not only is demand very light, but prices have further declined and afford little or no margin for profit. Some of the best-informed furnacemen and brokers are inclined to the opinion that the lowest price has been reached, while others are apprehensive of still lower prices. One thing is certain, if the market has not touched bottom it is nearer than at any time yet. Prices are lower now than any one expected they would go, and it is not likely that they will go much lower; \$15, cash, is a very low price for standard brands of Gray Forge, and it is rumored that they can be bought for less; as is also \$17.25 @ \$17.50, cash, for No. 1 Foundry. The above prices show a decline of \$2 @ \$3 per ton within a few months. While consumers admit that prices are very low, and that furnacemen are not any more than holding their own, they still have an idea that the market may go still lower. This accounts for the fact that they refuse to anticipate future events. Quotations may be fairly given as follows:

Neutral Grav Forge.....	\$14.50 @ \$15.00.	cash
White and Mottled.....	14.00 @ 14.50	"
All Ore Mill.....	15.50 @ 16.00	"
No. 1 Foundry.....	17.25 @ 17.50	"
No. 2 Foundry.....	16.50 @ 16.75	"
No. 3 Foundry.....	16.00 @ 16.25	"
No. 1 Charcoal Foundry	24.00 @ 24.50	"
Cold Blast Charcoal.....	25.00 @ 25.00	"
Bessemer Iron.....	16.60 @ 16.85	"

Muck Bar.—There have been no sales reported below \$26.50, cash, and some makers refuse to sell for a fraction less than \$27, and sales have been made at the outside quotation within the past week. There is no margin at present prices, so it is claimed, notwithstanding the further decline in Pig Iron.

Manufactured Iron.—The market for all kinds of Finished Iron is still reported light for the season, and, while hopes of an early improvement are entertained, the outlook in some respects is not as encouraging as it might be. There is no denying that the labor troubles, which have been so common of late throughout the country, have had a very bad effect, as many contemplated improvements have been delayed so long, in order to see what the result of these troubles would be, that some of them will be held over until next year. Prices are still quoted upon a basis of 1.75¢ @ 1.85¢ for Bars, 60 days, 2% off for cash.

Nails.—There is but little change to note in the general position of the Nail trade. Demand continues light for the season, the three factories here paying any attention to the business working but lit-

tle over half-time, and the prospect for improvement is not very encouraging. Prices remain unchanged at \$1.90, 60 days, 2% off for cash, in carload lots, and upward. According to agreement at the meeting of the Western Nail Association, the new card goes into effect on the 1st of June. Some of the manufacturers are not very enthusiastic in regard to the change, and some of the Wheeling manufacturers express themselves in a similar way.

Wrought-Iron Pipe.—The Pipe trade continues in an unsettled and unsatisfactory condition. Not only is trade light for the season of the year, but prices are being cut to such an extent that there is nothing in the business, and, as stated in our last report, some manufacturers are not soliciting business. They prefer to remain idle rather than to operate their works for nothing. A few years ago the Pipe trade was the best department of the Iron trade, but having been overdone—capacity suddenly increased considerably beyond the demand—it is now the poorest. Some of the mills are running pretty full, others not much, if any, over half their capacity, while others again are doing nothing. There is no hope of uniform or remunerative prices until the Pipe Association is reorganized, and of this there appears to be little prospect at present. The demand from natural gas and oil companies is not nearly what it was a year ago.

Old Rails.—The demand has fallen off somewhat as compared with what it was a month or so ago, and the market is weaker; in consequence, we are advised of a small sale of American Tees at \$22.50, cash, against a sale the preceding week at \$23. The demand is for small lots for immediate delivery, and consumers in this way are paying more than they could buy at for future delivery. Foreign Rails are still shut out of this market, as they cannot be sold here in competition with American.

Steel Rails.—Heavy sections are quoted at \$31.50, cash, at mill. Now that the Edgar Thomson Works are again in operation, there will doubtless be some business here before long.

Billets, &c.—We can report sales of some 2000 tons Bessemer Steel Billets at \$28.75, cash, delivered at mill of buyer. The seller has his works here, and having rail communication with the mill of the buyer, can deliver at an expense of 25¢ to 30¢ per ton. All the mills here are in direct rail communication with each other, and when they buy and sell to each other there is an understanding as to delivery; whether buyer takes it at mill of the seller or whether the seller delivers at the mill of the buyer. American Wire Rods quoted at \$41.50 @ \$42.50, cash; Domestic Rail Crops, \$17.50 @ \$18.

Railway Track Supplies.—Spikes are quoted at from \$2 to \$2.15, 30 days, with it is understood, an open market. Splice Bars, \$1.80 @ \$1.85; Track Bolts, \$2.85 with square and \$2.95 with hexagon Nuts.

Merchant Steel.—Best brands Tool Steel, 8¢ per lb; Crucible Spring, 4¢; Crucible Machinery, 5¢; Open-Hearth Machinery, 2¢.

Old Material.—Dealers report trade slow and prices very close. No. 1 Wrought Scrap, \$20, net; No. 1 Wrought Turnings, \$13.50 @ \$14; Car Axles, \$25 @ \$25.50; Cast Scrap, \$16 @ \$17, gross; Cast Bearings, \$11.50 @ \$12.50; Old Car-Wheels nominal at \$19 @ \$20.

Percy Preston and Geo. A. Humphreys, formerly with H. E. Collins & Co., Iron and Steel brokers, at Pittsburgh, who recently withdrew from that firm, have

formed a partnership under the firm style of Preston & Humphreys, and will do a general Iron commission business, with headquarters in the Lewis Block.

Louisville.

LOUISVILLE, KY., May 7, 1888.

Pig Iron.—The buying during the past week has been in small quantities and no improvements have been shown. There is a demand for Foundry grades and Mill Irons rather than off-colored Irons, and furnaces seem short of both 2 and 2½ Foundry; and in several instances offers at the present market price have been rejected on this account. The Eastern market is better for Southern Irons than Ohio River points. This, if continued for any length of time, will have a tendency to strengthen the market here.

Southern Coke, No. 1 Foundry...	\$17.00 @ \$18.00
No. 2 "	16.00 @ 17.00
No. 2½ "	15.50 @ 16.50
Hanging Rock Coke, No. 1 Foundry...	17.50 @ 18.50
Hanging Rock Charcoal, No. 1 Foundry...	21.00 @ 22.50
Southern Charcoal, No. 1 Foundry...	18.00 @ 20.50
Silver Gray, different grades.....	14.50 @ 15.50
Southern Coke, No. 1 Mill, Neutral.	14.50 @ 15.50
" No. 2 "	14.00 @ 15.00
" No. 1 " Cold Short	14.00 @ 15.00
White and Mottled, different grades	13.50 @ 14.50
Southern Car-Wheel, standard brands.....	20.50 @ 21.50
Southern Car-Wheel, other brands.	18.50 @ 20.50
Hanging Rock, Cold Blast.....	22.50 @ 23.50
Hanging Rock, Warm Blast.....	18.50 @ 19.50

Detroit.

WILLIAM F. JARVIS & Co., Pig-Iron merchants, Detroit, report as follows under date of May 7: It is a somewhat difficult matter to make up a report of the condition of the Iron business at the present time in this vicinity that would be satisfactory to either buyers or sellers. The market unquestionably seems to be getting somewhat weaker all the time, but many are about making up their minds that it is pretty nearly the bottom. The market will naturally be helped to quite a considerable extent when any number of buyers come to this conclusion. Their purchases alone, owing to their having allowed their stocks to run down, would strengthen the market. While the deals in Coke Irons have been small, the transactions in Charcoal Iron have in many cases assumed the form of quite round lots, that is, 1000 to 2000 tons. Some of the purchases are made by buyers who depend upon navigation for their supply of Iron, and whose stocks have become exhausted during the winter, and who now desire more Iron hurried to them as fast as the boats can carry it. While these orders have been taken, and perhaps strengthened the market a little, no advances are possible at the present time, and with the exception of Lake Superior Charcoal we report a dull market at the following prices:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$21.00
Lake Superior Coke, All Ore.....	19.50 @ 20.00
Lake Superior Coke, Cinder Mixed.....	18.50 @ 19.00
Standard Ohio Blackband.....	19.50 @ 20.00
Southern No. 2.....	18.25 @ 18.75
Southern Silvery.....	17.50 @ 18.00
Jackson County, Ohio, Silvery.....	19.00 @ 19.50
American Old Iron Rails.....	22.00 @ 23.00
Old Wheels.....	20.50 @ 21.00

The recent successful researches of Dr. Gattermann, of Göttingen University, in connection with chloride of nitrogen, have shown this powerful explosive to consist of one atom of nitrogen and three atoms of chlorine. It explodes with the greatest violence on coming in contact with organic substances. It may also be violently dissociated by the action of the sun or of the magnesium light, while it never explodes in the dark or on dull days.

Financial.

OFFICE OF THE IRON AGE,
WEDNESDAY EVENING, May 9, 1888.

Careful observers of the condition of the various markets find satisfaction in the volume of trade throughout the country, which compares well with last year, and in the current earnings of railroads, indicating that a more liberal distribution of merchandise is in progress, notwithstanding sluggishness in the movement of grain. The latter have all the more significance from the fact that rates of transportation are much reduced, compared with one year ago. At the same time it is admitted that the general markets are dull and collections slow. The crops, too, are not particularly encouraging. Refreshing rains in California and at other points have for the present silenced the dismal croakings of the bull writers in the wheat market. The labor situation has decidedly improved; now that work has been resumed by the strikers in Pittsburgh, and on the Western railroads there is less apprehension of trouble from this source than for a long time past. The opening of navigation through the entire line of lakes will give a new impetus to water transportation. Ore shipments have not yet commenced. A Western dispatch says the Burlington and Northern is perfecting arrangements with lake lines that will enable it to take business from New York and all trunk lines points, lake, rail and canal, by way of Chicago, at the same rates as are now made by its rivals by way of Lake Superior, and in much quicker time.

The Stock Exchange markets have been less active and lower. Few of the changes were of much importance. On Thursday and Friday the market was irregular and feverish and at times weak. Missouri, Kansas and Texas bonds and stock were unfavorably affected by the news of the abrogation of the lease of the International and Great Northern, thus threatening seriously to damage the property. On Saturday lower prices were favored by an advance in sterling to within $\frac{1}{2}$ of the gold-shipping point, but it was reasoned that any possible firmness in money would be offset by bond purchases. A recovery at the close was stimulated by a favorable bank statement. On Monday an attack on Missouri Pacific had an unsettling effect. On Tuesday, influenced by news of the failure of W. T. Coleman & Co., of San Francisco, by lower prices from London and by the announcement of the intended shipment to Europe of \$250,000 in gold, the market opened generally lower and subsequently was irregular. The decline was assisted by the small purchases of bonds.

To-day an enormous amount of securities was ordered to be put on the register list, including Texas and Pacific—\$21,049,000 first mortgage 5% gold bonds, \$23,227,000 second mortgage 5% gold income bonds and \$32,181,700 common capital stock; also, that on June 1, 1888, \$6,525,000 additional common capital stock be added, making total amount listed on that date \$38,706,700. Atchison, Topeka and Santa Fé—\$7,000,000 additional capital stock be added to the amount now on list, on May 11, 1888, making the total amount listed \$75,000,000. New York, Ontario and Western—\$450,000 additional first mortgage 6% gold bonds; total listed to date, \$3,450,000. Missouri Pacific—\$14,376,000 trust 5% gold bonds.

The total bank clearances of the week in 36 cities show a decrease of 1.4% compared with the same week last year, against a decrease of 1.6% the previous week; outside of New York the decrease is 4% compared with last year.

The extreme ease in money is working a gradual change in the markets for securities. The rates on call remain about 1 $\frac{1}{2}$ % @ 2%, and institutions and individual

capitalists are compelled to go outside of the loan market in order to find profitable employment for their surplus funds. The banks already hold \$18,170,075 in excess of the 25% legal requirements, against \$4,522,600 last year and about \$11,000,000 in 1886, and the indications point to still higher figures in the near future. The domestic exchanges are running strongly in favor of this center, and the Treasury disbursements are also swelling the bank reserves. It is remarked that banks are less discriminating in time loans, but plan to keep their funds well in hand after the summer months. Loans are made at the lowest rate quoted by representatives of London and other European bankers.

Government bonds are quoted as follows:

U. S. 4½%, 1891, registered.....	106½ @ 106½
U. S. 4½%, 1891, coupon.....	107½ @ 108
U. S. 4%, 1907, registered.....	126½ @ 127½
U. S. 4%, 1907, coupon.....	126½ @ 127½
U. S. Currency 6%, 1895.....	121 @ 121
J. S. Currency 6%, 1896.....	123 @ 123
J. S. Currency 6%, 1897.....	125 @ 125
U. S. Currency 6%, 1898.....	128 @ 128
U. S. Currency 6%, 1899.....	130 @ 130

The business failures of the week number 234. Most conspicuous of all is that of the old New York and California house Wm. T. Coleman & Co., with liabilities placed at \$2,000,000, while the assets are estimated at \$4,000,000 to \$4,500,000. Their indebtedness on the Pacific Coast is chiefly to the Bank of California, Bank of British Columbia and the Bank of Nevada. Obligations equal in amount are held in the East, mostly by banks. The shipping department is agent for several lines of clippers to and from Australia, China and other ports. The business of the firm is said to amount to \$14,000,000 per year.

According to the Custom House report, the exports of specie from New York last week were \$589,000 and the imports \$13,000, making the totals since January 1 \$9,415,586 and \$4,588,185 respectively, as compared with \$8,990,000 and \$4,902,000 for the same time in 1887.

The imports of merchandise at this port during the week amounted to \$9,059,000, of which \$2,000,000 were dry goods. Since January 1 the total is \$171,102,000, as compared with \$165,532,000 for the same time last year and \$154,165,000 in 1886. The exports were scarcely half the value of imports, amounting only to \$4,956,993. Since January 1 the total is \$103,050,000, against \$105,138,000 for the same time last year. The items include 388,000 bushels of wheat, 15,000 bales cotton, 7000 barrels petroleum.

A statement prepared at the Treasury Department shows that the total amount of bonds purchased to date, under the circular of April 17, is \$10,495,400, of which \$6,305,450 are 4 per cents and \$4,189,950 are 4½ per cents. The total cost of these bonds was \$12,473,047, of which \$7,964,677 were paid for 4 per cents and \$4,508,370 for 4½ per cents. If the bonds purchased had been allowed to run to maturity the interest thereon would have amounted to \$3,506,042 more than their purchase price, including premium. Of this interest saving \$3,195,969 is on the 4 per cents and \$310,033 on the 4½ per cents. While the purchases for the last few days have been small, the Treasury receipts have been unusually large, the revenues for seven days aggregating \$8,700,451.

The general markets are quiet, excepting the extraordinary collapse in tin. In wheat speculation fluctuations were small. England has been out of the export market for two weeks, Europe meanwhile depending largely on the Russian crop, which this year is excessive. American prices are 4¢ @ 6¢ $\frac{1}{2}$ bushel above export business. Provisions are weak. Coffee neglected. Cotton active and higher, on an increased export movement. Dry goods jobbers report transactions for autumn on orders from the extreme South and Southwest, which is exceptional at this early date.

New York.

American Pig.—The market has been dull to the point of utter stagnation, and for that reason has remained practically nominal. Complaints are heard in various quarters that what anxiety there is to sell seems to come rather from producers and middlemen from other cities and sections than from those more directly identified with the New York market. We hear of offerings of standard Lehigh and of Southern Irons at a cut by Philadelphia houses, and of some eagerness to sell off Irons from the Shenango and Mahoning valleys. Thus No. 1 Southern is offered at \$19 in New York harbor, and Western No. 2, of good quality, at \$18.50 on the Hudson River. New England, too, appears to be actively drummed. So far as we can learn, however, very little business is being done. With the market closing dull and irregular, we quote nominally standard No. 1 Lehigh, \$20 @ \$20.50; No. 2, \$19 @ \$19.50, and Gray Forge, \$16 @ \$17.

Bessemer Pig.—We note a sale at private terms of a block of 5000 tons of Domestic Bessemer, which is stated to be chiefly lower numbers, the higher numbers have been sold by the furnace for foundry purposes. It is reported that deliveries have been postponed or contracts have been canceled in a number of cases. We quote \$18 at furnace, average of the numbers, which figure has been shaded. Foreign Bessemers can be purchased at \$19, ex-ship, which is altogether too high in the majority of cases. There is some inquiry for Foreign Special Pig for Open-Hearth, and negotiations are pending for one lot of 3000 tons, 0.04 phosphorous and 0.02 sulphur.

Spiegel and Ferromanganese.—An inquiry from the West for Spiegel brought a little flurry, but, buyers' and sellers' views being too far apart, did not result in business. English makers are stiff chiefly because they are having considerable trouble in securing freight room for Ores, which are obtained chiefly in Spain. German makers ask 65½ marks, at works, with 5 @ 6 marks freight to shipping port. Then, too, the difficulty in securing sailer room is interfering with business. It is estimated that a good deal of business still remains to be done for Western Rail mills, who have bought very little thus far for this season. Ferromanganese is quiet, with quotations, nominally, \$50.50 @ \$51.

Scotch Pig.—The market is very dull with Coltness at \$20.25 @ \$20.50; Summerlee, \$20 @ \$20.25 and Dalmellington, \$18.50 @ \$18.75.

Bar Iron.—We quote for carload lots, on dock, half extras, Common 165¢ @ 1.7¢; Medium, 1.7¢ @ 1.8¢ and Refined, 1.8¢ @ 1.9¢.

Structural Iron.—We quote: Angles, 1.15¢ @ 2.25¢; Tees, 2.6¢ @ 2.7¢; Channels and Beams, 3.3¢, on dock. Bridge Plates continue 1.9¢ @ 2¢.

Plates.—We quote: Tank, 2¢ @ 2.10¢; Shell, 2.25¢ @ 2.4¢; Steel Tank, 2.2¢ @ 2.4¢; Shell and Flange, 2.45¢ @ 3¢, and Fire-Box, 3¢ @ 3.25¢.

Steel Rails.—The market is dull and weak, sales not exceeding, East and West taken together, more than about 15,000 tons. Rumors of close prices in both the principal markets are numerous and appear to have some foundation in fact. Practically the situation is that the Eastern mills are fairly well supplied with work up to July and August, but there appear to be always a few of them eager to take business to fill up gaps. Thus far they have had quite a considerable share of the Western business, taken earlier in the year. The New England market is now supplied for the year, the leading lines of the Middle States east of the Allegheny

Mountains have bought, so that only some additional business can be expected from the South. For the present they are practically excluded from the West, since \$32 @ \$32.50 at Chicago does not net more than \$28.50 @ \$29 at Eastern mill. In the West the two largest works are short of orders, while the other larger competing mills are only partially supplied with work. It is well known that considerable business has been withheld, but until it has been placed and the order books of the Western mills are in considerably better shape than they are now Eastern mills must stand aloof. For the present and in the near future the course of the market in Chicago must determine the future. We quote Standard Sections at Eastern mill \$30.25 @ \$31.

Blooms and Billets.—An inquiry for a block of 1000 to 3000 tons of 4-inch Soft Steel drew from importers offers to sell at \$29.50, with in one case the suggestion that buyer made a firm offer of \$29. We do not hear of any business.

Wire Rods.—The market is in the same condition. A number of moderate-sized lots have been sold, with considerable inquiry still in the market. Importers ask \$40.75 @ \$41 for May and June shipment. Foreign producers quote 105/ at shipping port, with freights fluctuating anywhere between 10/ and 14/.

Old Rails.—Sales are reported in different sized lots of about 3000 tons in the aggregate, some of the transactions having been made on the basis of \$20.50 in yard. It is reported that a block of 5000 tons has been sold for Pittsburgh delivery at private terms.

According to the Metal Exchange statistics the stocks in bond were as follows on May 1 and April 1:

	May 1.	April 1.
Pig Iron	1,918	1,988
Spiegel	2,192	2,192
Old Rails	15,818	16,477
Scrap Iron	1,700	1,470
Scrap Steel	611	611
Steel Blooms and Billets	824	824
Wire Rods and Bars	10,887	11,638

Metal Market.

Copper.—On Thursday of last week Chili Bars advanced in the London market from £80 to £80. 2/6 spot, and from £76 to £78. 5/ futures, with sales of 150 tons, while in this city there was greater activity, 525,000 lb changing hands at 16 1/4 @ 16.35¢ spot; 16.40¢ @ 16.55¢ June and 16.35¢ @ 16.50¢ July. On Friday London gave way to £75 with futures, spot remaining unaltered, sales amounting to 250 tons, our own market being fairly active at a slight advance, 300,000 lb being taken at 16.35¢ @ 16.50¢ May, and 16.50¢ @ 16.55¢ June. On Saturday our market was firm and 50,000 lb May were sold at 16.50¢ @ 16.55¢. London declined 2/6 with spot on Monday, to £80, futures remaining unaltered, £75, and the sales again being 250 tons, while our own market was quiet but steady, sales being limited to 50,000 lb July at 16 1/4¢. Yesterday London remained unaltered, with sales of 200 tons, while here the market was steady, with a moderate trade doing, 200,000 lb at 16 1/4¢, for May, and 16.40¢, October. A telegram from Boston, dated May 3, stated: "Calumet output, April, 2460 tons. Two small openings have been made at No. 1 and No. 2 Hecla shaft. Nothing coming up but gas; no sign of fire. Charcoal gas is being sent down No. 1 Hecla and No. 3 Calumet shafts. Fans will probably not be put to work for some days yet." London is unaltered, both spot and futures, to-day. The New York market closes quiet to-day at 16 1/4¢, Lake, spot, and May, June and July, 16.50¢ @ 16.60¢. On the Paris Stock Exchange Rio Tinto shares declined 1 1/2

francs last week, on Monday 14 francs. Negotiations are still going on in the pool sale, to which we have repeatedly alluded. The Sheet Brass manufacturers, at a meeting last week, showed some determination to hold aloof for better terms, and are understood to be desirous of securing a guarantee that the market will be sustained during the existence of the contracts about to be entered upon. The collapse of the Tin deal has given them a good pretext for their position. The Plumbers' and Cast Brass manufacturers are stated to be anxious to see a greater difference than 1¢ made between casting brands and Lake. They demand a difference of 1¢.

Tin.—Since our last-week's report spot Tin has gradually come down from £95 in the London market to £80, and futures are worth as much, both closing with a quiet feeling. The market here has been very much unsettled. On Thursday 10 tons spot were sold under the rule at 20.30¢, on Saturday 10 tons June at 18¢, and yesterday 10 tons May at 18¢. Gradually Tin on the spot has been getting into firmer hands. In a jobbing way it has been bringing 22¢ @ 23¢. Our market closes quiet, with sales 10 tons July at 17 1/4¢, June being held at 18¢ and May at 20¢. **Tin Plates.**—Have on the whole been but moderately active and weaker on the spot, while futures, at the lower prices at which they are offering from Liverpool, begin to attract more attention. We quote large spot lots as follows: Siemens-Martin Steel, Charcoal finish, \$5.10 @ \$5.30; ditto, Coke finish, \$4.80 @ \$4.90; Ternes, which are scarce, \$4.30; Bessemer Coke, \$4.55, @ \$4.65 and Wasters, \$4.45 @ \$4.50; Penlan Grade Cokes, \$4.50 @ \$4.55. Coke Tins are selling at £13. 3/ in Liverpool.

Lead.—Has been flat and remains so still, at private sale, some 300 to 400 tons Common Domestic having been taken by consumers at 4.50¢ @ 4.60¢, but at the close it would be difficult to sell any, even at 4 1/2¢. On Saturday, on Change, 98 tons May and June were taken at 4.60¢, on Monday 32 tons June at 4.55¢ and yesterday 16 tons June at 4.47 1/2¢. In London, meanwhile, Soft Spanish gave way yesterday from £13. 5/ to £13. English Pig being quoted £13. 5/.

The Mechernich Lead Company in Germany declared a dividend of 16% for 1887 against 15% for 1886. The company produced last year 23,199 tons of Pig Lead, as compared with 22,809 in 1886, and, besides, 7803 kg. silver, against 6145.

Spelter.—Very little has transpired on the spot at 4.62 1/2¢ @ 4.65¢ for ordinary brands, while Silesian is nominally worth 5.70¢. Silesian can now be laid down cheaper at Hamburg from the interior, in consequence of freight reductions by rail, and there is more doing thence for export to trans-Atlantic countries. The London quotation of Silesian remains £17. 15/.

Sheet Zinc is selling at 6 1/2¢ @ 6 1/4¢, Domestic.

Antimony.—Has been steady with a moderate inquiry at 13 1/2¢, Cookson, and 10 1/2¢, Hallett, the latter being quoted £46 in London.

New York Metal Exchange.

The following sales are reported:

THURSDAY, May 3.	
50,000 lb Copper, July	16.35¢
200,000 lb Copper, July	16.50¢
10 tons Tin, spot	20.30¢
25,000 lb Copper, spot	16.45¢
25,000 lb Copper, spot	16.35¢
50,000 lb Copper, spot	16.25¢
25,000 lb Copper, June	16.40¢
100,000 lb Copper, June	16.55¢
25,000 lb Copper, July	16.50¢

FRIDAY, May 4.	
25,000 lb Copper, May	16.35¢
25,000 lb Copper, May	16.40¢
25,000 lb Copper, May	16.45¢

75,000 lb Copper, June	16.50¢
50,000 lb Copper, June	16.55¢
100,000 lb Copper, May	16.50¢

SATURDAY, May 5.

20 tons Tin, June	18.00¢
25,000 lb Copper, May	16.50¢
25,000 lb Copper, May	16.55¢
50 tons Lead, May	4.60¢
48 tons Lead, June	4.60¢

MONDAY, May 7.

50,000 lb Copper, July	16.50¢
32 tons Lead, June	4.55¢
10 tons Tin, June	18.00¢
50,000 lb Copper, May	16.50¢
50,000 lb Copper, October	16.40¢
50,000 lb Copper, May	16.50¢
16 tons Lead, June	4.47 1/2¢
50,000 lb Copper, May	16.50¢

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from May 1 to May 5, inclusive, and from January 1 to May 5, inclusive, were as follows:

Iron and Steel.

	May 1 to May 5.	Jan. 1 to May 5.
Tons.	Tons.	Tons.
Iron Ore: C. L. Wright & Son.	750	1,630
R. De Flores	722	2,304
A. Earnshaw	473	4,494
Pig Iron: C. C. C. Bros.	200	3,600
Jas. Williamson & Co.	100	2,100
Spiegel: Naylor & Co.	267	1,807
J. A. Jansen	220	10,032
Steel: F. S. Piditch	53	178
J. Abbott & Co.	18	208
C. F. Boker	15	54 1/2
Sanderson & Co.	15	15
R. F. Downing & Co.	14	129
Chas. Hugill	7	107 1/2
C. W. Power	5	26
Steel Rods: A. Milne & Co.	125	1,115
S. A. Galpin	150	1,860
J. Abbott & Co.	105	2,999
J. A. Roebling's Sons	50	528
R. F. Downing & Co.	22	59
Cary & Moen	10	369
Steel Billes: Naylor & Co.	405	416
J. Abbott & Co.	80	673
H. Crowsban	20	20
Steel Blooms: W. H. Walbaum	1,518	2,379
Steel Sheets: R. Crooks & Co.	41	84
Lalance & G. Mfg. Co.	29	213
Steel Slabs: J. Abbott & Co.	51	51
Steel Forgings: Thos. Prosser & Son	111	1,877
Steel Rails and Bloom Ends: Dana & Co.	751	751
Sheet Iron: T. B. Coddington & Co.	30	511
Rivet Rods: R. F. Downing & Co.	10	10
Screw Rods: American Screw Company	25	327
Ferromanganese: C. L. Perkins	750	2,700
Iron: J. Abbott & Co.	80	911

Tin Plates.

Boxes.	Boxes.
15,600	176,232
7,671	92,842
4,273	53,222
3,320	15,043
3,227	25,453
2,468	14,607
2,436	36,172
1,377	53,535
1,000	8,219
880	43,820
112	112
88	26,523

Metals.

Pounds.	Pounds.
560,231	1,364,284
224,156	6,555,110
11,223	11,223
10,000	92,400

Casks. Casks.

Antimony: Phelps, Dodge & Co. 50

Metals.

Tin: Muller, Schall & Co.	560,231	1,364,284
J. Abbott & Co.	224,156	6,555,110
A. Thomsons & Co.	11,223	11,223
Nickel: McCoy & Sanders	10,000	92,400
	50	50
Furman, Alfred & Co., Arms, cs., 10		
Field, Alfred & Co., Cartridge Case, cs., 2; Nails, boxes, 8; Mdse., cs., 20; Cutlery, cs., 13. Anvils, 110		
Folsom, H. & D., Arms, cs., 6		
Frasse, P. A. & Co., Mdse., case, 1		
Godfrey, C. J., Arms, cs., 3		
Grafe Cutlery Company, Cutlery, cs., 4		
Hoe, R. & Co., Mdse., cs., 3		
Hartley & Graham, Arms, cs., 4		
Hunnmann, Auckam & Co., Mach'y, cs., 20		
Lau, J. H. & Co., Arms, cs., 4		
Loatza, Wm., Mach'y, pkgs., 2		
McVickar, Mach'y, cs., 22		
Merch. Disp. Co., Mach'y, cs., 77; Arms, cs., 20		
Meter, Geo. & Co., Arms, pkgs., 25		
Newton & Shipman, Files, cask, 1		
Ranft, Richard, Iron Nails, cs., 12		
Sanderson & Sons, Mach'y, pkgs., 118		
Schoverhing, Daly & Gales, Gun Barrels, cs., 11		
Sellers, W. B., Mdse., cs., 2		
Taylor, Thos., Mdse., cs., 6		
Order, Machines, pkgs., 7; Iron Ware, bds., 219; Mach'y, pkgs., 20		

Iron and Metals Warehoused From May 1 to May 5, Inclusive.

	Tons.
Scrap Iron: Jas. E. Ward & Co.	70
Lead: Hendricks Bros.	224,028

Exports of Metals.

	May 1 to May 5.	Jan. 1 to May 5.
	Pounds.	Pounds.
Copper: J. Abbott & Co.	4,151,408	3,770,272
Lewisohn Bros.	118,028	2,581,293
F. A. Lomax	50,000	3,304,803
American Metal Co.	112,828	223,939
J. Bruce Ismay	112,000	560,000
S. Mendel	110,276	230,664
Ledoux & Co.	224,034	490,000
Copper Queen Con. M. Co.	112,026	1,250
J. Kennedy, Tod & Co.	224,881	125,000
H. Becker & Co.	125,000	765,880
Orford C. & S. Rfg. Co.	125,000	67,500
Robt. M. Thompson	250,000	112,000
Thos. J. Pope, Sons & Co.	276,227	184,288
J. Parsons & Co.	2,276,227	22,446,158
Bridgeport Copper Co.	2,953,380	519,485
C. Herold	295,000	458,500
Copper Matte: Williams & Terhune	722,777	184,288

Coal Market.

The improved tone in the Anthracite Coal trade observed since the beginning of the month continues, and the Coal producers evidently desire to have it understood that stability is a permanent characteristic of the market; that the output is entirely within control, and that those who desire to purchase Coal must pay what it is worth. There appears to be entire unanimity in sustaining prices, so that even the outside individual operators are said to manifest less anxiety to sell. Nevertheless, the sale is reported of a cargo of Lehigh Stove Coal in New York harbor at \$3.90 alongside, a cut of 55¢ under circular price. The Coal comes from individual operators. The companies are expecting more activity, especially in the Western trade, as soon as navigation is fairly open. Eastern trade is impeded by the scarcity of vessels and high freights, but tonnage will be in better supply when cargoes of ice can be obtained for the return trip. Freight rates are quoted 95¢ @ \$1.05 and discharge from Port Richmond to Boston. Lehigh Coal, to furnace operators only, has been reduced to \$2, but other producers have not followed the example. The New York Board of Education contracted for 17,000 tons of Coal at \$5.07 per ton.

The Anthracite production for the week shows but little change in the statistical position, the total being 621,142; increase, 29,000; ditto for the year, 11,115,000; increase compared with 1887, 51,000 tons. While the Wyoming output remains stationary Schuykill increased 6000 tons and Lehigh 23,000 tons.

Bituminous is quiet. The full productive capacity of the six regions supplying Eastern markets is practically sold up. Vessels at Philadelphia are scarce, and barges are gaining control of the traffic at slightly lower rates.

The Pennsylvania Railroad Company report 236,500 tons of Coal transported during the week and 3,853,000 tons since January 1; increase for the year 421,000 tons. The Reading carried 147,000 tons during the week, of which 64,000 tons were shipped to Port Richmond and Elizabethport.

The Delaware and Hudson Canal Company are building a 15-mile double-track extension on the Susquehanna division, and are putting some money into new Coal terminals at Weehawken, N. J.

The Reading Coal and Iron Company report all their collieries running on full time, and little or no dead work being done.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, May 9, 1888.

The further decline in the price of Block Tin and absence of any visible evidence of a new move on the part of the syndicate leaves the market in a state of great uncertainty. It is estimated that the syndicate must have held something like 20,000 tons previous to the late break in order to handle the market as they did, and the best information that can be obtained on the matter goes to show that only a small portion of that large stock has yet been unloaded. As a matter of fact, it is stated by well-informed parties that more Tin has been sold on the decline by followers of the "syndicate" than by the "syndicate" itself. Naturally there is still a great reluctance among consumers to stock up despite the fact that prices are now much below the average and outside speculators are extremely cautious as well. The belief is expressed in some quarters that a sharp reaction from the present low level of prices is more probable than is any further depreciation of value, and it is the opinion of some of the more conservative merchants that the Tin Plate makers would be quick to step in and buy freely in the event of an upward movement of prices. Three months futures are said to have been sold at £75 to-day.

The Tin-Plate market, as a matter of course, is still very much upset. Makers are more inclined to watch the course of the Block-Tin market for a cue to operations than to undertake anything in the way of extensive business at the present time. Buyers appear to be committed to the hand-to-mouth policy for the same reasons that sellers hold back, and liberal concessions from the quoted spot prices have proved to be little inducement to place anywise extensive orders for future deliveries. Prices for spot stock are about 6d. lower now than a week ago.

There have been no signs of any weakening on the part of the "syndicate," as far as Copper is concerned. Less confidence is shown in the ability of that interest to further enhance values in view of the steady additions to surplus stocks and the continued tendency toward economy in the use of the metal by consumers. Outside speculation is, therefore, cautious in character and comparatively small.

Most branches of the Pig Iron market remain in a dull and depressed condition and "warrants" have been sold the past week at prices below the lowest point touched last year. Makers' brands have also sold at concessions in several instances. Overproduction, contraction of the export trade and very meager speculative interest are the main factors in the current depression. Present prices are at a point very close to the cost of production, and it is the general belief that any further decline would lead to not a few furnaces being blown out, and a change for the better in prices later on. There are now in Connal's stores about 975,000 tons Scotch Pig.

There has been a heavy decline in prices for finished Iron in the Staffordshire district. Galvanized Sheets have dropped no less than 30%, in consequence, mainly, of the fall in the price of crude materials used in that industry. This led to a decline of about 7/6 on Black Sheets and Hoops, and Plates have dropped 5%. The weakness naturally operates to check business more or less for the time being.

The Shelton Iron and Steel Company have started up a new Steel works at Hanley. It is the most extensive establish-

ment in North Staffordshire, having a capacity of about 4000 tons per week.

Messrs. Merry & Cunningham are adding a new Siemens-Martin process plant to their works at Kilmarnock.

The Cockerill Company have secured a contract for 13,000 tons of Steel Rails for the Venice and Brindisi Railway. The price is not stated. There was a sharp competition between Bolckow, Vaughan & Co. and other prominent manufacturers for the order.

The Steel trade generally has been quieter the past week. Prices have eased off somewhat in Wire Rods, but for Rails, Blooms, Billets, &c., makers' figures stand just about as they were a week ago.

Scotch Pig.—The market continues dull, with prices still weak and irregular:

No. 1 Cottiness, f.o.b.	Glasgow.	48/
No. 1 Summerlee,	"	47/
No. 1 Gartshetrie,	"	44 6
No. 1 Langloan,	"	46 6
No. 1 Carnbroe,	"	39/
No. 1 Shotts,	at Leith.	45 6
No. 1 Giengarnock,	Ardrossan.	44 6
No. 1 Dalmellington,	"	40
No. 1 Eghinton,	"	39/
Steamer freights, Glasgow to New York,		
7/6; Liverpool to New York, 7/6.		

Cleveland Pig.—Demand has been slow, and the market is rather weak at a slight decline. No. 1 Middlesboro', G. M. B., 34/; No. 3 do., 31/3.

Bessemer Pig.—More business doing, and the market steadier at last week's decline. West Coast brands, mixed numbers, 42/6, f.o.b.

Spiegeleisen.—Only a moderate demand, but prices are held very firmly. English 20% quoted 77/6, f.o.b.

Steel Rails.—The market steady, but rather slow. Standard sections quoted at £3. 17/6, f.o.b. at N. W. England works, Middlesboro' district about 5/- less.

Steel Blooms.—Very little doing and prices nominal. We quote at £3. 12/6 @ £3. 15/ for 7 x 7, f.o.b. at N. W. England works.

Steel Billets.—Steady market, with the demand running fair. Bessemer, 2 1/2 x 2 1/2 inch, £3. 15/ @ £3. 16/3, f.o.b. at N. W. England works.

Steel Slabs.—Market steady but quiet. Bessemer, £3. 15/, f.o.b. at N. W. England works.

Steel Wire Rods.—Demand has slackened and prices are easier. Mild Steel No. 6 quoted at £5. 18/6, f.o.b. at N. W. England Works. No. 5 about 2/6 less.

Old Rails.—Market dull and prices barely steady. Tees quoted at £2. 17/6, and Double Heads £2. 19/3 @ £3, c.i.f., New York.

Scrap Iron.—Demand slow and the market weak. Heavy Wrought at £2. 5/ @ £2. 10/, f.o.b.

Crop Ends.—Dull market and prices nominal. Bessemer quoted £2. 5/ @ £2. 7/6, f.o.b.

Tin Plate.—Dull market and prices weak and irregular. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	15/	@ 16/
IC Bessemer steel, Coke finish.	13/	@ 13/3
IC Siemens	"	13 3/8 @ 13/6
IC Coke, B. V. grade	19/	@ 13/3

Charcoal, Terne, Dean grade..... 12 3/8 @ 12 9/

Manufactured Iron.—Market dull and prices unsettled. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	5	7 10 0
" Common "	5	0 0 @
" Blk Sheet, singles	6	5 0 @

Welsh Bars (f.o.b. Wales)..... 4 15 0 @

Tin.—Moderate business and tone of market weak. Straits quoted at £80, spot, and £75 for three months' futures.

Copper.—Demand smaller and tone of market less firm. Chili Bars, spot, closed at £80. Futures, £75. Best Selected, £80 @ £81.

Spelter.—Barely steady market, but a fair business passing. Silesian, ordinary, £17 @ £17. 5/ at the close.

Hardware.

There has been but little change in the volume of business since our last report, and complaints are made that the demand at the present time is not up to its normal volume. While there have been but few changes in price the market is not characterized by as confident a tone as could be desired. Reports from other markets in many cases indicate a better state of trade and feeling, and in view of the prosperity of the country at large it is hoped that a fair business will be done during the remainder of the season.

Barb Wire.

The market continues without material change, the quotation of the Eastern manufacturers on Four-Point Galvanized being 4 cents for carload lots, 4.15 cents for 3-ton lots and 4.30 cents for small lots. The effect of irregular quotations in the West is somewhat felt, and some Wire has been offered here at lower prices.

Wire Nails.

The bulk of the spring business having been done so far as the taking of large orders is concerned, a lull in the demand is reported, the business transacted being for the most part in comparatively small assortments. The manufacturers' quotations remain without change at \$2.70 for carload lots and \$2.85 for small lots. Their plan in regard to deliveries is reported to be working satisfactorily, and prices by the leading manufacturers are well maintained. Some of the holders of the Nails seem, however, to be disposed to offer slight concessions.

Nails.

With a good volume of business doing, the market continues irregular, so far as prices are concerned, the contest against the two Susquehanna mills who initiated the cutting of extras being kept up, chiefly in the interior. We quote \$1.90 @ \$1.95 for carload lots of Iron Nails, on dock, the leading sellers, however, meeting these figures only when the specifications are satisfactory. Store prices are \$1.95 @ \$2.05. To-morrow the meeting of the Eastern Association will be held in this city. The principal subject for discussion will probably be the proposed new schedule of extras. A good deal of figuring has been done on the subject. The usual sum added to the base price for what is called a fair specification figures out under the present schedule at 30 cents to 35 cents. The proposed schedule would lessen this from 10 cents to 20 cents, according to the specification, while the new Western classification figures out 10 cents better than the present Eastern schedule. One block of 13,650 kegs of Nails, representing an actual sale, would give the Western seller 16.67 cents more than it would to an Eastern mill under the present schedule of extras. The same block would fetch 6 cents less under the proposed Easterd card than it would bring under the old Eastern card.

In his annual report Mr. James M. Swank, secretary of the American Iron and Steel Association, alludes to the Cut-Nail trade as follows:

The statistics we are about to present of the production of Iron and Steel Cut Nails and Cut Spikes in the United States in 1887 do not embrace railroad and other Spikes made from Bar Iron, Wire Nails of any size, or machine-made Horseshoe Nails. Our total production of Cut Nails in 1887 was 6,908,870 kegs of 100 pounds each, against 8,160,973 kegs in 1886, 6,696,815 kegs in 1885, and 7,581,379 kegs in 1884. The production of 1886 was the largest the country has ever attained. The decrease in the production of Cut

Nails in 1887 was mainly due to the increased competition of Wire Nails. In 1886 the production of Wire Nails was about 600,000 kegs, made by 27 Wire-Nail works; in 1887 the production is estimated at 1,250,000 kegs, made by 47 works. The chiefly compete with Cut Nails.

Fourteen States made Cut Nails in 1887. The following table shows the production of Iron and Steel Nails respectively in 1887, and the total production of that year compared with the total production of 1886:

States.	1887—Kegs of 100 pounds.			Total 1886, kegs.
	Iron.	Steel.	Total.	
Pennsylvania...	1,458,324	779,841	2,238,165	2,569,237
Ohio.....	514,737	1,157,391	1,672,128	1,703,790
West Virginia.....		827,325	827,325	899,600
Indiana.....	222,096	176,944	399,040	339,992
New Jersey.....	341,060	5,057	346,117	345,168
Illinois.....	12,049	263,023	275,072	614,055
Massachusetts.....	224,599	42,854	267,453	516,749
Califor.ia.....	237,811	20,382	258,193	224,163
Virginia.....	212,808	37,711	250,519	212,552
Kentucky.....	59,720	100,000	159,720	144,000
Wisconsin.....	54,560	24,380	78,940	205,489
Alabama.....	54,000		54,000	206,500
Colorado.....	17,408	28,317	45,725	52,383
Tennessee.....	10,406	26,067	36,473	88,289
New York.....				34,015
Nebraska.....				5,000
Total.....	3,419,578	3,489,292	6,908,870	8,160,973

The displacement of Iron Nails by Steel Nails has progressed very rapidly. In 1884 the production of Steel Nails in the United States (including 500 kegs of combined Iron and Steel) was only 393,482 kegs, or 5 per cent. of the total production of Nails. In 1885 the production of Steel and combined Iron and Steel Nails was 1,823,127 kegs, or 27 per cent. of the total production. In 1886 the production of Steel Nails alone was 2,968,989 kegs, or 36 per cent. of the total production; and in 1887, as the above table shows, the quantity of Steel Nails produced exceeded that of Iron Nails, being over 50 per cent. of the total production.

The two leading Cut-Nail producing districts of the United States are known as the Wheeling and Central Pennsylvania districts. The Wheeling District embraces four counties, all bordering on the Ohio River—Ohio and Marshall Counties in West Virginia, in which counties all the Nails works of the State are located, and Belmont and Jefferson Counties across the river in Ohio, the city of Wheeling being near the center of the district. Central Pennsylvania embraces the counties drained by the Susquehanna River and its branches. The following table shows the production of these two districts in the last three years:

Distr'ts.	1887—Kegs.			1886, Kegs.	1885, Kegs.
	Iron.	Steel.	Total.		
Wheel'g dist...	24,000	1,824,116	1,848,116	1,858,551	1,297,136
Central Pa.....	962,340	260,060	1,222,400	1,389,482	1,472,797

The Belmont Nail Company, Wheeling Iron and Nail Company and Benwood Iron Works, of Wheeling, W. Va., announce under date of April 30: "With a view to the greater convenience of the trade, and bringing the supply nearer to the market, we have established a joint agency at St. Louis under charge of Mr. John A. Gibney. We will keep in warehouses there on railroad tracks ample stock for prompt shipment of urgent orders, but expect to ship stock orders direct from the factories.

Miscellaneous Prices.

There has been a slight advance in the prices of Axles, some of the manufacturers of Half Patent Iron and Steel Axles having increased their discounts, and are now quoting as follows: Nos. 7 to 14, discount 55 per cent.; Nos. 19 to 22, discount 70 per cent.

There are indications of increasing outside competition in the manufacture of

Common Carriage Bolts, and it is thought not unlikely that the associated manufacturers will consider the advisability of somewhat reducing the price at the close of the present season with a view to meeting this competition. There are, however, no intimations given of an immediate change.

The market for Wrought-Iron Pipe rules low with a moderate volume of business. There is some irregularity in the prices quoted by the leading manufacturers.

The Essex Horse Nail Company, Essex, N. Y., for whom J. C. McCarty & Co. are agents, 97 Chambers street, New York, are manufacturing the Essex, Saranac, Lyra and Snowden brands, which are quoted at the following prices:

Essex (No. 8, 25 cents), dis. 25&10 to 25&10&10 Saranac (No. 8, 20 cents), discount.....30&10 Lyra (No. 8, 22 cents), discount 40&10&5 to 50 Snowden (No. 8, 22 cents), dis...40&10&5 to 50

The company refer to the good demand that there is for these different brands and the satisfaction which they give. In view of the prevalence of a report that they had discontinued the manufacture of the Snowden Horse Nails, the Company desire the trade to understand that this brand is still in the market and that they are prepared to furnish them promptly.

Geo. Chase, First avenue and 107th street, New York, in connection with his varied line of Stones, quotes Hacker's Stone Extra No. 1 at \$4.50 per gross.

Items.

The manufacturers of Saddlery Hardware held a meeting at the Palmer House, Chicago, on the 1st inst., for the purpose of arranging some details of their association. Among those present were Fred. Frazer, of Frazer & Jones Company, Syracuse, N. Y.; Mr. Dawson, of the P. Hayden Saddlery Hardware Company, Columbus, Ohio; H. W. Minnemeyer, of Minnemeyer & Co., Pittsburgh; Ogden P. Letchworth, of Pratt & Letchworth, Buffalo; Wm. E. North, of O. B. North & Co., New Haven, Conn.; John Wilson, of P. Wilson & Sons, Cincinnati; Mr. Geschwind, of Elbel & Co., Canton, Ohio, and Mr. Nixdorff, of Nixdorff & Krein Mfg. Company, St. Louis. On the following day the Hame Manufacturers' Association held a meeting at the same place with substantially the same membership.

The Douglas Mfg. Company, 123 and 125 West Washington street, Chicago, of which J. Russell Jones is secretary, have brought out a new Tricycle, called the Chicago Tricycle. It is described as absolutely anti-friction in both belt and bearings, without the use of oil; strong and durable, yet light and compact; will pass through an ordinary doorway, and the same machine can be conveniently used by either a 12-year old child or a 250-pound man, thus meeting the requirements of each member of the family capable of such recreation, with special adaptability to ladies' use.

The Peters Cartridge Company, Cincinnati, Ohio, issue a circular devoted to their Peters Cartridges for trap and field shooting, and giving price list and descriptive matter. Testimonials are also given in regard to the quality of the Cartridges. They also send out a score sheet which shows some remarkable shooting with the Cartridges.

The Odell Hardware Company, Greensboro, N. C., represent in their catalogue a variety of some of the leading goods which they are handling, and they refer to the advantageous prices they are in a position to offer. Their storehouse consists of two double-brick buildings, each 80 feet long by 24 feet wide, three rooms in each, and one warehouse 114 feet long by 20 feet wide.

Hall & Willis Hardware Company, Kansas City, Mo., issue new pages for their catalogue relating to the following goods: Churns, Can Openers, Lawn Mowers, Genuine Bronze Locks and others. They also call attention to some changes in list.

The Michigan Wire and Iron Works, Detroit, Mich., issue a neat catalogue describing the lines of Wire Cloth of which they are manufacturers, and calling attention also to their other lines, including Wrought Iron Fences, Iron doors and Shutters, Wrought-Iron Bedsteads, Railings, &c.

The catalogue of the Susquehanna Iron Works, Raymond & Campbell, Middletown, Pa., represents their line of Cornwall Silver Iron Bells, Hollow-ware and miscellaneous goods, including Cast-Iron Hog Troughs, Cellar Window Grates, Bake Oven Doors, &c. In their introductory circular they call attention to the special styles in which they now make and finish their Bells, and describe the mixture of which they are made, to the excellence of which they refer. They state that they have determined to make a run on these Bells, and are consequently offering them at a low price.

The Sterling Emery Wheel Company have removed from 22 Warren street to 17 Dey street, New York, where they will be able to carry a much larger stock and better assortment of Emery and Corundum Wheels with an increased variety also of Machinery and Polishing Supplies.

Colt's Patent Fire Arms Mfg. Company, Hartford, Conn., have issued a catalogue of their Military and Sporting Arms, which will be received by the trade with much interest. It represents their line of Revolvers, which have a world-wide reputation, and illustrates the different patterns, giving all necessary information in regard to calibers, ammunition, &c. It is to be noticed that the company have recently added some new sizes. A description is also given of their New Lightning Magazine Rifle, with an explanation of its mechanism and an illustration of the different patterns manufactured. This Rifle, .22 caliber, has very recently been put on the market, and embodies some new features to which we shall have occasion to refer hereafter. The sights which are made for the Lightning Magazine Rifles and Shotguns are also illustrated. Their Hammerless Double-Barrel Shotguns, which was brought out in 1883, is also represented, with a full explanation of the action of the Gun. Their Double-Barreled Breech-Loading Shotguns are also shown. List prices are given throughout. The sending out of this catalogue is a fact of much interest, indicating as it does the purpose of the company to put their Arms on the market through the trade to a greater extent than heretofore. The additions to their line will also be regarded with special attention.

A more careful examination of the catalogue of S. D. Kimbark, Chicago, relating to Carriage Hardware, &c., shows the completeness of the book, as well as its systematic and satisfactory arrangement. It is divided into six parts, Carriage and Wagon Hardware, Carriage Trimmings, Carriage Mountings, Carriage Trimmers' Tools, Carriage and Wagon Paints, Varnishes, Brushes, &c., and Malleable Irons. Other catalogues are also issued by Mr. Kimbark relating to other departments of his business—namely, the department of Iron, Steel, Nails, Heavy Hardware, Tools and Machines, and the department of Carriage and Wagon Wood Material, Seats and Vehicle Parts.

We have received a copy of the *Athletic Journal*, published by J. B. Field & Co., Detroit, Mich. It is an 8-page paper devoted to summer sports and outdoor past-

times, in which are represented a number of leading articles in the line indicated, including Baseball, Tennis and special Athletic Goods, many of which are illustrated and prices given. There is also a variety of interesting matter more or less nearly connected with the goods represented. In this way the attention of their customers is very pleasantly called to the seasonal lines handled by this enterprising house.

Hamilton & Matthews, Rochester, N. Y., have issued a price list of Hardware, which is deserving of special mention. It departs from the conventional type of Hardware catalogues in the fact that it is almost entirely free from illustrations, the 160 pages of which it consists being devoted to prices of leading Hardware goods, of which numbers and brief descriptions are given with the list prices and discounts. It is neatly and clearly printed and well arranged, and from its comparatively small size will be found admirably adapted to the use of those for whom it is intended, the illustrations which are generally given in catalogues being to those who are familiar with the goods in many cases an encumbrance to the volume, making it necessarily bulky and unwieldy. While the volume covers a wide range of Hardware and related goods, attention is called to the fact that it does not comprehend the entire line of the enterprising house which issues it. The prices quoted are referred to as the present average market rates, but it is intimated that legitimate competition will be met, and it is suggested that the trade will run no risk in sending in their orders.

The Composite Iron Works Company, 83 Reade street, New York, issue a pamphlet devoted to the Bostwick Patent Folding Gate, the different uses of which are referred to and illustrated. They also call attention incidentally to other goods which they are putting on the market.

The Challenge Refrigerator Mfg. Company, Cincinnati, Ohio, issue a catalogue in which illustrations are given of their line of Refrigerators, representing also the patterns which have most recently been added.

The Hart Mfg. Company, Cleveland, Ohio, whose Duplex Die Stock is illustrated on page 73, report that trade has opened up very well the present month, and that they have received orders from British Columbia, Australia and Germany, and an inquiry from Köln-am-Rhein. Home trade continues steady and good.

Timothy B. Hussey, North Berwick, Me., issues a circular giving a description of his Patent Steel Harrows, with different attachments. Of these Harrows four sizes are made, cutting in width 3½, 4½, 5½ and 6½ feet, respectively.

The catalogue and price list of Silver-Plated Ware and American Chains of the Oneida Community, Niagara Falls, N. Y., is an elegantly printed pamphlet and shows in attractive style the goods to which it relates. The American Chains are alluded to as made entirely of steel, and attention is called to their neatness, safety and the low prices at which they are offered. They include Halter Chains, of which 11 sizes are made, Coil Chains, 11 sizes, Cow Ties and Hercules Sash Chains. The new Lock Snap illustrated on page 733 is used with this line of Chains, and its advantages are referred to.

Our readers will remember that in our issue of April 12 we published the announcement, received by cable, that the case under the

Merchandise Marks Act

against A. J. Jordan, St. Louis, Mo., and Sheffield, England, to which we had before referred, was dismissed. Since then

we have fuller information in regard to the matter, and learn that the case was dismissed without Mr. Jordan's being required to give any testimony or bringing any witnesses in his defense. It appeared that the complainants were unable to show that any one had been deceived by Mr. Jordan's trade-mark, which was not calculated or intended to deceive, but was a bona fide mark of his own. Referring to the case the *Sheffield Telegraph* remarks that Mr. Jordan had done nothing to justify the extreme course adopted, and states that his AAA1 is not sufficiently like A1 to deceive the trade. It refers, also, in the following terms to Mr. Jordan and his enterprise:

It may not be known generally that Mr. Jordan is an American manufacturer who has brought an important and improving business to Sheffield. He has brought to the town a large trade, which otherwise would not have come here. He employs a large number of hands who otherwise would not have found work in Sheffield, except by displacing a corresponding number. He hardly competes with any local firm, inasmuch as the trade he has brought to the town is now, so far as Sheffield is concerned, the creation of his own brains and energy, and is an actual addition to the volume of trade. Mr. Jordan's object in coming to Sheffield was to supply his customers in America with the finest Pocket Cutlery that Sheffield could produce under his own superintendence. Had Mr. Jordan been as dishonest as he is smart a man of business, he might have continued his manufacture at St. Louis and falsely marked his goods as of Sheffield make. He, however, chose the honest policy of setting up his factory in Sheffield.

Export Trade.

The American Consul at Malaga, in a report just published, points out the excellent opportunity there is to sell American Cooking Stoves in that part of Spain, but states that they must be constructed in a manner to suit the requirements of the people and packed so as to be easily and safely transported. After referring to American houses in sending illustrated catalogues by which to sell their goods when the articles themselves ought to be sent, he adds the following significant paragraph:

There is here also a splendid opportunity for the introduction of all kinds of American Hardware, for our manufacturers beat the world, especially in the finish of the article. English made goods unnecessarily contain more than double the quantity of metal, are heavy, cumbersome and uncouth in appearance, while ours have all the required strength for durability, with the additional "finish" which English make does not possess. There is not an American Hatchet for sale in Malaga, and as yet nothing that will take its place.

Trade Topics.

Hardwareman writing from Connecticut refers to the annoyance suffered in trade from the fact that consumers are by the manufacturers or jobbers in many cases furnished goods at trade prices. On this point he remarks:

The main difficulty seems to be a tendency to ignore the dealer. We who carry stocks of goods are told by our customers that they can buy as cheaply as we can. Of course we know that this is not so, but the very fact that the consumer honestly believes it is proof positive that cutting *sub rosa* is the order of the day. This is all wrong, and in the end must result in dividing trade between the manufacturer, the retailer and the consumer, totally ignoring the jobber.

One of our correspondents, a Hardware house in Massachusetts, advises us that in order to satisfy their curiosity they have kept a Drummer's register since January 1, and up to May 4 report 236 calls. Can any of our readers make a better showing?

Freezers.

The following account of the Ice-Cream Freezers put on the market by the leading manufacturers will be of interest, embodying, as it does, information which will be of service to the trade:

White Mountain Freezer Company, Nashua, N. H., are known as large manufacturers of Ice-Cream Freezers, of which they make an extensive variety. The Freezers represented in the company's catalogue for the present year are the following: White Mountain Hand Freezer, with crank, sizes 2, 3, 4, 6, 8, 10, 12, 15, 20, 25, 50 quart, fly-wheels being furnished for the larger sizes if desired; Hotel and Confectioners' Freezer, with fly-wheel, 15, 20 and 25 quart; New Platform Freezer, improved for 1888, with fly-wheel, either painted or galvanized, 15, 20 and 25 quart; and the Samson Power Freezer, 25 and 40 quart, of which different patterns are made. The company also manufacture the Combination Gear Frame for 15, 20 and 25 quart Freezers, which is so constructed that two fly-wheels can be attached, or a fly-wheel and crank, or two cranks as may be preferred. It is intended especially for use when the cream is partially frozen and requires considerable strength to operate the machine. They also make Sand's Patent Freezer Clamp or Holder, the object of which is to hold hand Freezers firmly while freezing cream. The company, among other points, call attention to the excellence of the tubs, which are made of clear white pine, made waterproof by a patented process; to the quality of the cans and other parts, and especially to the triple motion, the value of which is emphasized.

Sidney Shepard & Co., Buffalo, N. Y., are manufacturers of the Buffalo Champion Ice-Cream Freezer, of which several patterns, including a wide range of sizes, are made. It has been upon the market for some years, and improvements have been added until it is now regarded by the manufacturers as perfect. The Buffalo Champion geared Freezers, with heavy tin cylinders, are made in the following sizes: 2, 3, 4, 6, 8, 10, 12, 16 and 20 quart, and their different parts are separately illustrated in the circular of the manufacturers. Their line of fly-wheel Freezers include Freezers with a capacity of 16 quarts and upward. The object of the fly-wheel is to secure a rapid revolution of the cylinder with the least complication of parts and the most economy of power. The tubes are seasoned cedar, and have galvanized iron hoops. Special claims are made for the merit of this Freezer. The Buffalo Champion frame Freezers, for power or hand, are made in 32 and 40 quart, with heavy copper cylinders, while the Duplex Freezer, for hand or power, which is two Freezers together, has a still larger capacity. These machines are intended for the use of confectioners and hotel keepers. The iron frames with which they are constructed are referred to as giving permanent and substantial bearings to the fly-wheel shafts. By a simple movement of the levers on the top of the frame the Freezers can be set in motion or instantly detached when in motion. All the castings of these Freezers are of galvanized iron.

The Gooch Freezer Company, Cincinnati, Ohio, are manufacturers of the well-known Peerless and Giant Freezers. The Peerless are made in sizes 3, 4, 6, 8 and 10 quart, while for confectioners' use and hotels the Giant are manufactured in the following sizes: 14, 16, 21, 25, 34 and 42 quart. These Freezers have been on the market for 17 years, and the manufacturers advise us that they are constantly adding improvements either in the style of finish or in the working gear. The dashers are described as self-adjusting, and when placed in the can going directly to the

center and resting, whether the can is filled with cream or not. The can and dasher revolve in opposite directions, but the dasher turns with greater speed. The vacuum behind the detaching leaf produced by its revolutions is referred to as drawing the air to the bottom of the can when the center leaf works it with the cream, thus creating, it is claimed, an agreeable lightness. The Giant Freezers are made on the same principle as the Peerless, but are extra strong and heavy and have fly wheels.

The Shepard Hardware Company, Buffalo, N. Y., are manufacturers of the Lightning Ice-Cream Freezer, quadruple motion, of which it will be remembered that we recently gave an illustrated description as a machine lately placed on the market. The company lay special stress on the revolving-wheel dasher, the hinged top and the covered gearing, and the fact that they use a cedar tub, which is referred to as large, affording plenty of ice space. This machine is made in the following sizes: 2, 3, 4, 6, 8, 10 and 14 quart.

The Kingery Mfg. Company, Cincinnati, Ohio, are manufacturers of the Cyclone Ice-Cream Freezer, which is made in sizes from 4 to 40 quarts, and, when desired, the machines are furnished with copper cans, for which 25 cents per quart extra is charged. They also make the Economy Freezer, which is made in 2, 3 and 4 quart sizes, on which quotations at net figures are made.

C. W. Packer, 20 North Fourth street, Philadelphia, is well-known as the manufacturer of the Standard, Expert and Model Ice-Cream Freezers, as well as of a Confectioners' Machine Freezer. The Standard Freezers are made in sizes 2, 3, 4, 6, 8, 10 and 14 quart. The improved method of hanging the beater strip, or scraping the bar, patented March 10, 1885, is referred to as insuring perfect fitting of the scraper against the can and thoroughly scraping it during the freezing, as it accommodates itself to any inequalities in the surface of the can that may occur during use. The Standard Freezer is also made double action for the use of confectioners, hotels, &c., the gear wheels being referred to as extra heavy and large, insuring durability and ease in operation. They are made in the following sizes with fly wheel 10, 14, 18, 24 and 32 quart, and with crank, 10 and 14 quart. The Expert Freezer is made in sizes 2, 4, 6 and 8 quart, and is recommended where economy of ice and cost of Freezer is an object. The can has iron cover and bottom. It is sold from the same list as the Standard but has a larger discount. The Model Freezer is made in sizes 2, 3, 4 and 6 quart, and from the simplicity of its construction is offered at a lower list than the others. These Freezers have white cedar pails, self-adjusting scraper bar, &c.

American Machine Company, Philadelphia, for whom John H. Graham & Co., 133 Chambers street, New York, are agents, are manufacturers of the Gem, Crown and American Ice-Cream Freezers. The Gem is a double-action Freezer, in regard to which the manufacturers call attention to the following points: That the pail is made of cedar; that the gearing of the machine is completely covered; that by the double action the can is moved in one direction while the stirrer moves in the opposite direction. It is also claimed to be especially economical in the consumption of ice. Each Freezer is entirely wrapped in heavy paper. They are made in the following sizes: 2, 3, 4, 6, 8, 10 and 14 quarts. They are also making the Crown Freezer for boarding-houses, hotels, confectioners, &c., which is also double action, the cross-bar being arranged to swing upon one side of the pail, so as to permit the removal of the can, while the fly-wheel remains stationary on the opposite side of

the pail. This Freezer is made in the following sizes, without fly-wheel: 8, 10, 14, 18 and 24 quarts; and with fly-wheel in the following sizes: 8, 10, 14, 18, 24 and 32 quarts. They also make the American Freezer, which is single action, the can only revolving. It is of the following sizes: 2, 3, 4 and 6 quarts. It is sold at a lower price than the other machines.

Valentine Clad, 117 and 119 South Eleventh street, Philadelphia, makes a line of large Freezers expressly for ice-cream manufacturers for heavy wear and tear. His catalogue represents the Seamen Improved Ice-Cream Machine, which is made in 30 and 40 quart sizes, and the Philadelphia Ice-Cream Machine, which is heavier and stronger than the Seamen, which is also made in 30 and 40 quart sizes. The Philadelphia Freezer is described as built on an iron platform with heavy iron housings, 50-inch fly-wheel, weighing 210 pounds, 14-inch steel shaft, babbeted bearings, 14-inch cedar tub, heavy copper cans with brass bottoms and heavy iron covers, heavy malleable iron tinned beaters, &c. The total shipping weight of the Freezer is stated to be 632 pounds. Mr. Clad is also about to make the same Freezer with engine attachment.

The Horizontal Freezer Company, Philadelphia, Pa., with a Western office, Port Byron, Ill., manufacture Blatchley's Horizontal Ice-Cream Freezer, in which, as indicated by the name, the machine is operated in a horizontal position. It is made in various sizes for families and for saloons and manufacturers. The sizes of the Freezers for family use are from 2 to 8 quarts, while the large machines range from 12 to 40 quarts, and are furnished with tin or copper cans, as desired. These machines are considerably more expensive than the regular line, and are sold to a good extent directly to consumers.

The Warranty on Saws.

Our readers will recall the circular which we published several weeks ago, issued by Foster, Stevens & Co., Grand Rapids, Mich., in which they called the attention of their customers to the large proportion of good Saws which are returned as defective. In reply to this circular they received a number of letters from the trade, and we take satisfaction in laying before our readers the following extracts. They also state that they have talked with and heard from more than 300 of their customers, and that, without exception, they express themselves as preferring that manufacturers should withdraw all warranties. The letters will be of interest as indicating the manner in which the question is looked upon by the trade:

A. H. Perry, Traverse City, Mich.—How can the taking back of good Saws be stopped? By the manufacturers combining not to warrant Saws at all.

David Cornwell, Monterey, Mich.—I have always refused to warrant Saws, and do not know as I ever missed making a sale on that account. Bought many for my own use previous to going into the trade and never returned one, and will never take one back after it has been used.

S. L. Rouse, Hobart, Mich.—It is at the option of the manufacturers to warrant their Saws or not to warrant them, and we can sell them either way. I do not return them until I am satisfied that I cannot sell the Saws.

N. W. Drake, Bangor, Mich.—I know of but one remedy, and that is not to warrant Saws at all. This remedy lies with the manufacturers. Let them make as good goods as possible, and sell them on their merits. I have no trouble with Hand Saws, for the simple reason that I have never warranted them, and I have sold hundreds of them. We can do just the same with Cross-Cut Saws if the manufacturers and jobbers will back us. My experience is this: A man comes to me and buys a Saw not warranted. He goes to work with the impression that the Saw is his. The result is, he takes all the pains he can to get a good man to file and set it in good shape. It works and cuts well and is a dandy Saw, and for the simple reason that it is his own Saw. Now, if I

had warranted the same Saw, ten to one it would have been returned in less than six days.

S. Spencer, Coloma, Mich.—During the past winter (1887 to 1888) I had returned to me five or six Saws, the material being referred to as imperfect. I resold them at a discount, and have heard from all the purchasers, but one, and they express themselves as well pleased. I believe that retailers should be more strict with their customers.

Sprague Bros., Greenville, Mich.—We have handled Cross-Cut Saws for years and given the matter a great deal of thought. There is but one remedy—and that is to stop warranting Saws. Just so long as they are warranted every retailer will take back Saws that ought not to be taken back, for the very reason that they would rather quarrel with the persons they buy of than the ones they sell to. This ought to be plain to every person. Suppose one of our good customers returns a Saw that we are quite certain is good, are we going to say to him that it is a good Saw and that we cannot take it back and see the customer go off in a huff and lose his trade? We are willing to own that we are not made that way, and the few that are are far too good to buffet around in this wicked world. If Saws are not warranted we shall get better Saws, for the users of them would soon learn who made good Saws, and the maker of poor Saws would be unable to sell at all. And another point is this: That the majority of Cross-Cut Saws on the market to-day are very poor, and ought to be thrown in the scrap heap. Just stop warranting Saws, and stop at once, and the whole difficulty is at an end, a result which will not be achieved until the warranty is discontinued.

L. M. Wolf, Hudsonville, Mich.—My impression is that if the manufacturers would make their Saws ready for use there would be far less trouble. My grounds for this impression are: 1. There are a great many men who cannot fit a Saw at all. 2. If an Edge Tool of any kind cannot be made to cut at first it cannot be made to cut at all. I sell from 40 to 50 Saws every winter, and only two came back this winter that were returned to the manufacturer. A dozen others that came back I fixed up and restored to the purchasers, and that is the last I heard of them.

Geo. W. Wood, Lake City, Mich.—I remember taking back only one Saw last year, and one is all this year. I have heard considerable complaint of their being too soft, but my customers get along with them some way. I think the dealers are as much to blame as any one. I try to persuade my customers that the Saws are calculated to be all right when sent out, and that many Saws are returned by parties who don't know how to fit a Saw, or I make some other excuse. I am of the opinion that where one complaint is made that a Saw is too hard 20 are made that they are too soft. I think that if all dealers were careful in taking back Saws only when they were satisfied that they were poor that the manufacturers would then be able to locate the trouble and make it right. I invariably tell my customers that I will not take any Saws back unless I am convinced that there is just cause for their return.

C. C. Turbury, Sullivan, Mich.—I see no better way to avoid the trouble you speak of than to get the manufacturers to agree to sell their goods without any warranty, and thus sell them on their merits. It would not be long before the users of Saws would learn that when they bought a Saw they would have to fit it or shoulder the blame themselves.

C. H. Loomis, Sparta, Mich.—We say do not warrant. No retailer likes to be bothered with exchanging Saws, but if a customer comes back with a Saw and reports it no good all you can do is to substitute one for it, as you cannot claim that your judgment is better than his. If you can persuade the manufacturers to form an agreement not to warrant any of their Cross-Cut Saws, and send out a letter to that effect to the trade next season, it would remedy the evil.

Hawks Bros. & Goff, Mancelona, Mich.—About six years ago we discontinued the practice of warranting all classes of goods handled by us. We do not think it lessens sales, and we avoid lots of trouble. We should like to see the practice of warranting goods abolished and let goods sell upon their merits.

C. L. Glasgow, Nashville, Mich.—My opinion is that dealers take back Saws without a proper examination, as half the Saws condemned as soft, &c., have failed simply because the one-eyed, ignorant purchaser could not fit them over a stump with an iron wedge or axe. Improper fitting, and not poor material, is the cause. The warranty on Saws is too broad and too long. Under the present rule a man can run a Saw all winter and return it in the spring. We make the following a rule: We warrant the Saw not too soft, and free from flaws, for a period of 10 days. The man who has the Saw the eleventh day owns it, and above warranty is based on the agree-

ment that the Saw shall be during the 10 days fitted only by a thoroughly competent and experienced man.

C. H. Moulton, St. Joseph, Mich.—I have bought Saws of you for three years and have never returned one to you. When I sell a Saw I never warrant it for more than 10 days, and when I sell to a man who does not know anything about a Saw I tell him if he injures the Saw it is his loss. More Saws are injured by persons who do not know anything about their application than in any other way. Once in awhile, of course, there is a soft one. I have often sent out Saws the second time after fitting them up and the owners reported them first class. I have found the warranty for 10 days the best thing ever done to give the manufacturers a chance for their lives.

The Outlook for Trade.

We give below further extracts from late letters in regard to the condition of trade, and the future outlook. It will be seen that the advices thus given relate to the most widely separated parts of the country:

ILLINOIS.

Joliet.—The prospect for spring and summer trade in Barb Wire is very good. Collections are fairly good, and the general feeling regarding the outlook for business we consider good.

Princeton.—This part of Illinois is an agricultural section, therefore trade depends on the success or failure of the farmers. For past three years there has been a partial failure of crops, and last year the extremely dry weather caused a large shrinkage in crops, causing a stringency in money matters which can only be alleviated by good crops this season. The prospect for building is light and collections slow.

Okawville.—Prospect for trade in this part of Illinois is worse than ever. Wheat looks poorer, and will not make one-third of a crop. Have had five poor crops, but this will eclipse them all. Our trade is all from farmers, and unless oats and corn turn out well our trade the coming season will be a disappointing one. Collections and sales look anything but encouraging. Building has almost ceased. Best of farmers are in debt, and have no remedy for getting out. Think many will go under this fall unless oats and corn help them out.

Quincy.—Our February trade and collections were unusually good, but March was correspondingly poor. April trade good again, but collections rather slow. We expect a good year, provided crops are good. It is entirely too cool and dry at present, but plenty of rain and warm weather will right everything in crop line. Country merchants buy carefully, and yet many of them have full stocks of goods. Building prospects are better than for years. General trade and collections fully up to last spring. Another dry year would be very hard on this section, having experienced two of the driest years ever known here.

OHIO.

Mt. Vernon.—The prospect is not good for a large trade this season. Farmers are not hopeful for a large crop of wheat and wool is low. Buyers are offering to contract at 20 cents a pound. Stocks of Hardware are about as usual this time of the year. There seems to be no speculative demand. There will be more building in the country than in town this year. Collections are very slow, as we depend largely upon the country for trade, and anything that affects the farmers affects the merchants.

Fremont.—General trade for 1888 up to April 1 has been with us about 25 per cent. better, with, however, a great per cent. of time sales. Collections have been fair. We do not think stocks are more than ordinary. We are not buying more than for present wants. The building

trade will be better than in 1887. Trade in general with us depends largely on the crops. Outlook at present is not good.

Mansfield.—I do not think that the general stocks of Hardware are large. We find collections very close, with farmers particularly. Prospects of building in our city are good, but it is a growing place. Hear of very little building throughout the country. I do not think that trade in general is satisfactory.

Elyria.—I think that the outlook for the Hardware trade in this section is far better than it has been the past two years, more contracts being made for building in town and country. Collections have been slow the past three months, and the farmer has but a very small amount to turn off to purchase money with during the spring months. Hardware stocks are full, but not abnormally so. The tendency is to purchase often, but not in large quantities. There is a better and more buoyant feeling in general trade this spring, and, if we have a good season for crops, I cannot see any reason why we should not look forward to a very prosperous year's business.

Van Wert.—The condition of our trade is slow. We have not as yet enjoyed the usual activity of spring trade, and cannot explain why, unless we attribute it to the backwardness of the season; and the result of a late trade is always a small one. The outlook for the coming season is not at all discouraging. This being a farming country, we are all, of course, interested in its products, and there is no apparent reason why this season should not be as good, if not better, than last season. A good deal of building is going on in the town and country, also improvements of different kinds. We think the Hardware trade outside of the gas boom towns are carrying the usual amount of stock, the stocks of the other towns being much larger. Collections are slow, but that must be expected at this season.

Longmont.—Owing to dry season of last year both trade and collections are a little below normal, but the outlook for the future is good, barring a little healthy retrenchment consequent upon last year's shortages. We shall look for at least the usual volume of business. Stocks are generally full, merchants availing themselves of the recent break in freights to stock a little beyond their immediate wants.

PENNSYLVANIA.

Centerville.—Stocks are fair. Building of cheap tenement houses considerable. Collections very slow. Prospects for an average trade in all branches of mercantile pursuits.

Columbia.—General trade in our section has improved wonderfully since the 1st of April. While our business showed a falling off for the first three months of the year of 8½ per cent., the month of April shows an increase of 11½ per cent. Prospects for building are good. The number of new buildings will decrease about 10 per cent., but the amount of money invested in them will increase about 25 per cent., owing to the fact that many of them will be of the better grade. Hardware stocks are as small as they can be conveniently kept, as there is a great feeling of uneasiness in regard to what Congress may do in reference to the tariff. Dealers are buying in a conservative manner in certain lines of goods, hoping for better prices. Collections are moderately good. They would be better were it not for some local causes, which have no bearing upon any other section of the country.

MAINE.

Bangor.—Taking our own business as a criterion we are warranted in saying that business in general is better than usual in

this section at this season of the year. The general outlook for the year we regard as favorable, and building prospects in this city and vicinity are particularly good. Stocks are about as usual at this season of the year. Collections are slow. Farmers are getting to work, and we look for a prosperous year.

Calais.—Collections are fairly easy. The prospect of building is good. We do not see anything to make us think we shall not have a fair business this year.

Skowhegan.—We think trade will compare favorably with the last few years. Stocks are about as usual. Prices being quite uniform, the dealers have not bought largely for speculation, but have kept their stocks well assorted. The prospect for building is quite good in this vicinity. The only thing to complain of is that collections are slow. The banks are short of funds, and large customers find difficulty in getting good paper discounted. But we think this will be for a short time only, and hope for prosperous business and good collections.

DELAWARE.

Milford.—General business is dull. Some think trade duller than a year ago, but I find it about the same. Building prospects in our neighborhood are encouraging for the coming spring. Our stocks of Hardware are not large, and are only influenced by the present demand. Among the farmers collections are very difficult indeed. The feeling at the present is very good, as the prospects for fruit are very flattering.

WASHINGTON TERRITORY.

Tacoma.—The state of business in general in this section has never been better. The increase in the volume of business is not less than 100 per cent. over that of a year ago. The receipts of freight for Tacoma via the Northern Pacific Railroad are now double what they were a year ago. Building is very active, but with the many dwellings and stores constantly being completed the supply does not begin to come up to the demand. Stocks of Hardware are being rapidly increased in extent, though with the increasing trade and the distance from the base of supplies it is almost impossible to keep stocks in shape.

CONNECTICUT.

Norwich.—The prospect for trade in this section is very good. We have never been more busy than at present. Building, which has been very quiet for the past four years, started up early in the fall of last year and promises to continue good through this year. Our stores throughout this section seem to be carrying good, full stocks, and collections are fair.

Norwalk.—Business in this section in our line is fairly good. The past winter was a severe one, and naturally put a temporary embargo upon trade. The prospect for building is very good and the outlook for the future bright. Stocks of Hardware are fairly good—certainly as large as our trade demands. Collections are slow and hard to make.

FLORIDA.

Ocala.—Trade in this city and surroundings has been fair this winter and spring. The season will be shorter than usual on account of truck farming (a very important business in our county) having been very badly crippled by a very long drought. Collections are slow for some reason. There are some brick buildings going up, but the most of them are to be used for stores, consequently not much Hardware wanted. Only a few frame buildings are going up. We are just entering the dull summer season and a large stock of hardware is on hand. Competition is very active. We are expecting a large orange crop and good trade in the fall.

Bartow.—The summer season is our dull season, and as a rule there is not much doing here. Just at present there are five brick store buildings going up, or rather near completion. A few dwellings are also in progress, and there is some talk of a large brick hotel and brick market house, an electric light plant being also among the probabilities. Outside of this I think trade will be very slow and collections dull, but if everything goes right I think there will be considerable improvement in the fall months. Stocks here are somewhat light.

NEW YORK.

Gilboa.—Outlook for trade is not good in this section. Stocks of Hardware are kept with an eye for immediate demands and consumption. Collections to any great extent are impossible. There will not be any building here this season, except actual necessary repairs. The business feeling is unsatisfactory, owing to the low price of farm productions, which consequently shortens the purchasing power of this community to such an extent that they can hardly make running expenses, not to say anything about the extinguishment of an old obligation. This state of affairs we believe to be the legitimate fruit of the threatened destruction of our protective system.

TENNESSEE.

Chattanooga.—Trade in this section at present is rather quiet. We think, however, that all Hardware jobbers in this part of the country have had quite a satisfactory trade this winter and spring. Country merchants have bought freely, and, so far, our collections have been fair. Prospects for building in this city are very good for the summer. Crop prospects through this section of the State are very good. Taking all things together we think the prospects for business are fairly good, although we don't anticipate quite as much trade as last summer. Our country generally is in good condition and looking up.

DAKOTA.

Scotland.—Business at present is not very brisk. Heavy fall of snow and continuous cold weather have delayed the spring trade considerably, and, as our trade is mostly from farmers, and their spring work having been interfered with, we cannot expect a very big rush. Building Hardware is about an average. Collections were from 1st of January very slow; little better since the 15th of March. Stocks of Hardware quite large for this season of the year. Fence Wire and other staple Hardware are, however, about an average. Prospects for building about an average. No big boom, but slow and sure development.

Aberdeen.—General business is late, on account of late spring, but believe that April will be fully up to one and two years ago. Collections are only fair. Merchants are all carrying light stocks, buying from month to month for their current wants. Stocks of Hardware men are light, and prudent buyers prefer to let the jobbers and manufacturers carry the stocks until the demand for the goods compels them to order ahead. Prospects for building this year are very good, and, although work was plenty last year, we believe that this year will exceed last.

Buffalo Gap.—Taken as a whole the outlook in the entire Black Hills country for the coming season is much better than it has been for several years. While collections are slow, they are much better than a year ago. Stocks in merchants' hands are much lighter than ever before, as the tendency is now to buy from hand to mouth for immediate requirement, all the dealers having learned to their sorrow that heavy stocks are an expensive luxury in a new country where but little dependence

can be placed on future requirements. While business is fair, and rapidly improving, with every reason to believe that this season will see more activity in mining and building than ever before, comparatively few goods are coming in, as the dealers prefer to buy light and go slow. The future prosperity of this section must depend largely on the success of Tin mining. One Tin mill is now in operation at Custer City, with every prospect of very extensive operation in that line soon.

VERMONT.

St. Johnsbury.—General business in this section is in a very fair condition. The feeling seems to be that we should have a good business the coming season were it not presidential year. The tariff question also leaves things in an unsettled condition, which affects the lumber business some. Prospects for building are fair, about the usual amount being done. Stocks of Hardware are up to the average, no increase to speak of. Collections have been slow all winter, and on account of late spring are still in the same condition. However, we live in hopes of better things as soon as the farmers sell their maple sugar and begin to ship their butter, the dairy interest in this section being a large one.

Bellows Falls.—Trade is yet quiet, except on Farming Tools, which are now in demand, owing to the late spring. Building has not yet begun with the usual push. Several houses are now in course of construction, and we look forward to a fair season's trade in that line. Stocks are not large, but well assorted. Collections very satisfactory, with a feeling that a good year's business is ahead.

NEW JERSEY.

Orange.—General business is good. Trade in agricultural goods has been delayed, owing to the backward spring, but it is now brisk. The prospects for building are not so bright as in previous seasons. There are, however, several important contracts in the hands of builders. Stocks of Hardware are ample. Collections are as good as usual, if not a little better. The feeling among the trade and the general public is good, and a fairly prosperous season is looked for.

KANSAS.

Anthony.—Business in all lines is very quiet, especially in the Hardware and Implement line, which lines are generally handled together in this country. In view of failure in crops last year there are, practically speaking, no collections. What little collecting is done is done only after the hardest pushing. There will be but little or no building here this season, or at least until the present crop is made, which, by the way, never looked finer, and prospect for an immense yield in small grain never was better. The Hardware stocks are low and dealers cautious. Do not expect any improvement until crop is marketed.

Atchison.—The general Hardware trade in Northern Kansas and Southern Nebraska has been fair. The western portion of both States, in which we do our jobbing trade, suffered seriously last year from a drought, and in consequence we were obliged during last winter to buy a good deal of feed, making money scarce. Trade is rather dull and collections somewhat slow. Ample rains through the winter and spring have put the ground into good condition, and we have bright prospects for a good crop. Trade is reviving materially and promises well for the fall. One other reason for small trade at this time is the overstocking by all the dealers, owing to the cut freight rates a month ago. Until this overstock is consumed trade will not revive materially.

Taking it all in all, the outlook for the future is good, and everybody is in a cheerful frame of mind.

NEW HAMPSHIRE.

Lebanon.—General business in our town has been rather depressed for the past year on account of a disastrous fire last May. Since then quite a number of the factories and business places have been rebuilt and about one-half the former number of men are now employed. General trade in this section is fair, collections good, and stocks in dealers' hands are as full as usual. The prospect for spring trade is favorable.

Littleton.—We can hardly form a correct idea as to business outlook at this time. It has been cold so far this spring, and business has just begun to brighten. Collections are rather slow. Our farmers depend largely on their potato crop and hay for money. Our potato crop was a failure. Hay crop remarkably good, but cattle were so low and plenty that they could not be sold, and of course hay had to be fed out instead of sold. There is about the usual amount of building, and we are looking for a fair trade this season. All our stocks of hardware are well kept up, but nothing is bought on speculation.

Portsmouth.—Business is better this spring in our locality than it has been for a number of years, which, of course, necessitates carrying larger stocks, and the amount of money trusted out is greater, although it comes in more readily than with a dull trade. The business of the place was formerly shipbuilding, but that has long since vanished and for a term of years the city had but little activity, the dealers depending upon the farmers' trade almost altogether. Finally wealthy people from the West and South discovered that we had some charming beaches in this vicinity, and large summer boarding houses and hotels were built within a radius of ten miles, the owners doing a profitable business and the trade from these resorts naturally coming to Portsmouth. We have one element, however, to contend with here. Portsmouth has always been considered a good place in which to live, but slow for business. There is a certain class of our citizens, whose forefathers made money during the war of 1812 privateering, and these descendants whose wants are few are quietly living on the income of their inheritance, and dislike the turmoil of a busy city and do all in their power to discourage any new enterprise. But they are gradually disappearing from the eyes of men and the ranks are being filled with younger men who have more energy and push and desire to bring business to our quiet city by the sea.

NORTH CAROLINA.

Charlotte.—Spring trade has been unusually heavy, and collections very good. Building outlook very encouraging and contracts are in hands of builders sufficient to keep them at work for the next four months. Stocks of Hardware very full. Farmers are in better financial condition than for several years past, and although spring is late they have their work well in hand, and crop outlook is very promising. Prospects are very good for spring and summer trade.

Greensboro.—Trade through this section this spring has been much better than ever before. Collections are not as easy as we would prefer them, but in the main are satisfactory. Merchants bought freely this spring, and, as the season has not advanced very far, have good stocks generally in hand. The outlook for building this season is good. The outlook for a solid good trade in the fall was never better than at present. We suffered some loss by the recent frost, but the wheat

crop looks very promising, and most farmers are getting their work well before them, so that the outlook is very promising indeed.

Raleigh.—This is an agricultural county, and it is yet too early to predict what the crop will be. Cotton and tobacco are the crops principally handled and raised. Business is generally very good in the fall and winter months. But, as we before stated, being an agricultural country, we would prefer not to see too many of our farmer friends until their crops are laid by. We have two Hardware stores in this place that carry large stocks—four Hardware stores in all.

Durham.—We are in the center of what is known as the Golden Belt tobacco region, that being our staple and money crop. It is rather early yet to tell what the prospects will be for this season. Everything looks encouraging now, and with good season crops will be abundant and money easy. Our planters have realized good prices and are in a healthy condition. The Hardware business has been backward this spring, but we have a good outlook for the summer and fall. Stocks are not heavy. Collections, while not entirely satisfactory, are up to the average. Our principal business now is furnishing supplies to the three new railroads which are centering here. These will be completed by August next, and we look for a boom in the building line then.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., May 8, 1883.

The interposition of several special orders will carry the general discussion of the revenue reduction bill, under the terms of agreement between the two parties in the House, over to the end of next week. It will be decided then whether to push ahead immediately with the consideration of the bill under the five-minute rule, or whether to take a turn at the appropriation bills. The end of the fiscal year will then be but six weeks in the future, a modicum of time quite inadequate to the disposition of the vast amount of detail embodied in the provisions of these bills. Representative Randall is very outspoken in his opinion that the Mills bill is dead. There is no doubt that his remark is based upon the attitude of his followers among the protection Democrats on the question of free wool. This will be the chief test of the sentiment of the two parties, as it is the principal feature of difference between the committee and the Randall bills. With free wool stricken out the Mills bill will have lost its most distinguishing feature.

Several canvasses have been made of the sentiment of the House on a number of leading items of the Mills bill as it stands reported from the Committee on Ways and Means. One side claims that free wool will remain in the bill, and the other that it will not. This uncertainty is largely due to the attitude of a few Republicans. Nine Democratic votes transferred to the solid Republican strength would accomplish that end. The loss, however, of a few Republican votes would be serious, as the margin of difference is small. The Ohio Democrats are likely to vote against free wool, but beyond that there is unmistakable uncertainty. There does not appear to be any encouragement of an increase of the duty on tin plate. Nor is there any likelihood that cotton ties will be placed on the free list. Pig iron will stay where it is. It is very doubtful whether the metal schedule will be very materially interfered with, except

in the item of steel rails. That product is probably the weakest of all the articles in the tariff schedules. The South and West are particularly determined on that point. They seem to ignore the fact entirely that the American policy of protection has been the means of bringing the price of rails down to their present minimum rate by building up the means of home manufacture. The Representatives of granger States and granger ideas make no allowance for that by recalling the enormous prices charged 10 and 15 years ago for the foreign article, but make capital at home by assailing the duty on steel rails. The canvasses of the House indicate the probable adoption of a middle rate between the present duty and the figures of the Mills bill, which would strike about where the Randall bill places it. It is evident that the leaders of the two parties are anticipating a stubborn contest when the parliamentary battle comes down to close quarters. The Republicans having appointed an amendment steering committee, consisting of Browne, of Indiana, on agriculture; Reed, on cotton textiles; McKinley, on wool and woolens; Kelley, on metals and manufactures, and so on through the list; the Democrats will hold a caucus to-morrow to name a similar committee. The charge of all amendments offered and tactical maneuvers contemplated or executed will be under their direction. This, on the Republican side, will doubtless insure united action and keep the weak-kneed in line. But whether it will have the same effect on the Democratic side is doubtful. Mr. Randall, Mr. McAdoo, Mr. Sowden, and not a very small number of others, are very emphatic in their declarations against every feature which makes the Mills bill characteristic of the line of revenue reform which leans to free trade.

The friends of the Mills bill have practically given up all expectation of being able to get the measure into any shape indicative of its condition by the time it gets through the parliamentary hopper before the assembling of the St. Louis convention. They have had several conferences among themselves, and the views of the President have also been ascertained. The proposition to make an effort to secure the adoption of a resolution endorsing the President's message and the Mills bill strengthens in favor. This issue may make a feature of the convention, as there will undoubtedly be not a few delegates who will not feel like taking such a radical position. In the selection of delegates to the convention it is noticeable that the men chosen indorse the President's position, which has the appearance of a fixed plan to control the convention in the interest of the economic policy of the Administration. If that plan should succeed it will draw the lines between parties on the tariff in a manner which has not been experienced of late years.

The conclusion of the general debate and the action of the House on the question of taking up the bill for speeches and amendments under the five-minute rule will very soon settle whether the intention is to go on at once or wait for some authoritative convention utterance. In that event it will be a matter of deep interest to watch what effect a mandate from such a high authority will have upon those who are disposed to regard the interests of their constituents above party.

At a meeting of the Eastern Pig Iron Association, held at Philadelphia March 27, it was decided to issue an address to its members, presenting grounds of opposition to the Mills bill. Copies of the address have also been sent to Senators and Representatives. The address is very highly complimented as a forcible illustration of the operations of the Mills bill from a practical point of view.

New Lock Snap.

The Oneida Community, Niagara Falls, N. Y., are manufacturing a new lock snap, patented November, 1887, which is represented in the accompanying illustrations.



Fig. 1.—New Lock Snap—Closed.

Their confidence in its excellence has led them to substitute it for the old spring snap on all their American chains. Fig. 1 represents the snap as closed, and Fig. 2 as open, and indicates in a general way the manner of its operation. It is constructed with a cam or eccentric, which is so made that the snap is opened only when in the position shown in Fig. 2, it being in all other positions firmly locked. It will thus be seen that it is exceptionally secure and



Fig. 2.—New Lock Snap—Open.

not liable to be unintentionally opened. It is represented full size in the cuts, its thickness being $\frac{1}{8}$ inch. The other points mentioned by the manufacturers are: That it has no springs to break, but it is strong and reliable throughout and is composed entirely of steel, and that it gives the chain a neat and symmetrical appearance, as well as its adaptation to satchels and fancy articles.

The Champion Blower and Forge Company, Lancaster, Pa., are actively pushing forward the work of rebuilding their foundry, which was recently destroyed by fire, and which also consumed most of their valuable patterns. Their machine shop

fortunately escaped damage and is at present being utilized as a mounting, foundry and machine shop combined. The capacity for production is consequently limited, but they inform us that in a few weeks they will be in shape to ship goods promptly as they are ordered. At the present time they are turning out from 15 to 20 complete machines daily, which is about one-half of the usual quantity produced by them.

The Beardsley Blotter Bath.

The accompanying illustrations, Figs. 1 and 2, represent a blotter-bath device which is being put on the market by

finished. Other points made by the company in regard to it are: That no cup or brush is required; that it saves time and labor, and is durable, simple in construction and always ready for immediate use.

In connection with the bath the Perfection Moistening Pads are furnished. These pads are made of cloth tipped at the end with brass strips, as shown in Fig. 2, rendering them convenient to handle, and admitting, it is claimed, of a larger number of impressions while insuring better results with less labor than other pads.

A number of iron and steel manufacturers at Pittsburgh are making large ship-

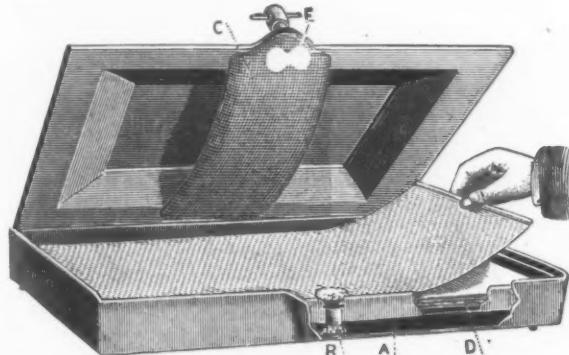


Fig. 1.—The Beardsley Blotter Bath.

the Beardsley Blotter Bath Company, Cleveland, Ohio. It is made under English, Canadian and American patents, January 3, 1888. The bath, which is made of iron, is intended for use in connection with the ordinary letter press, its purpose being to moisten the pads used in copying. Fig. 1 gives a general view of the bath, from which its principle and method of working can be readily apprehended. The water is placed in the reservoir A, and is carried by capillary attraction through the sponge in the tube B to the absorbent pad C, attached to the lid which rests on the sponge in tube B when the bath is closed. The pad C, being curved, also rests on the copying pads D, and in this way the moisture is automatically supplied. The knob E turns the metallic cap over the sponge in tube B, breaking the circuit when it is

ments of their products by water from New York to the Pacific Slope, on account of the excessive rates of freight charged by the railroads. The Mallory line of steamships to Galveston, Texas, is used, and from that point the Gulf Line Railroad, owned by English capitalists, carries the shipments to California.

For some time past the furnace operators in the Mahoning Valley, Ohio, and the Shenango Valley, Pa., have been complaining of the high rates of freight they were compelled to pay on their pig iron when shipped to Pittsburgh. After repeated requests from the furnace men the railroads have at last consented to make a reduction. A meeting of the freight agents of the various roads running through the valleys was held at Pittsburgh on Wednesday, the 2d

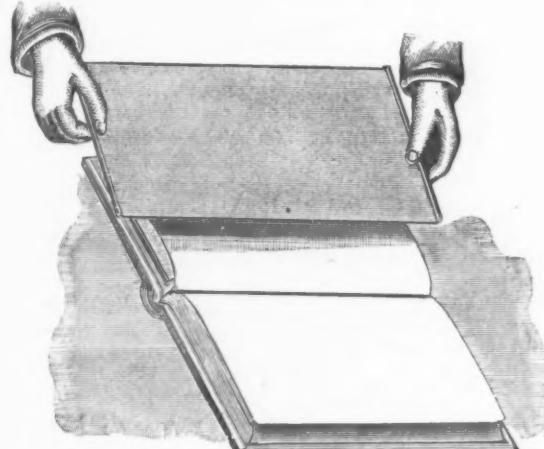


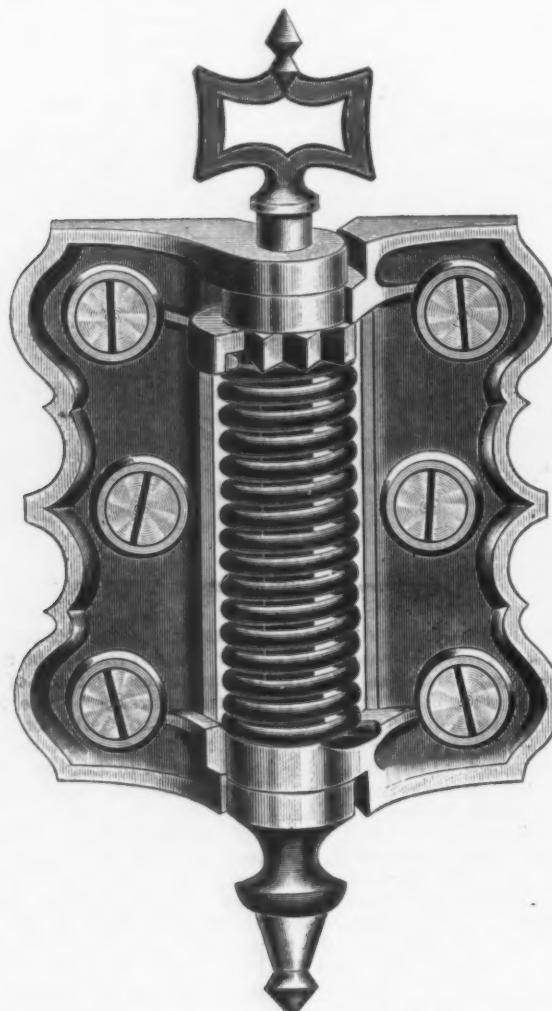
Fig. 2.—The Perfection Moistening Pads.

desired to stop the flow of water. Another tube in the bottom of the iron pan in which the pads are placed for dampening permits the entrance of water from the bottom also. By a simple contrivance the flow of water through this channel can be regulated or shut off so as to produce an even dampness through any number of pads. The bath is well made and

inst., at which the rate on pig and muck iron was reduced from 85 cents to 75 cents per gross ton, the rate on iron and steel scrap, skelp iron, blooms and billets was reduced from \$1 to 85 cents per gross ton, and the rate on mill cinder and roll scale was reduced from 70 cents to 65 cents per gross ton. The new rates went into effect on Monday, the 7th inst.

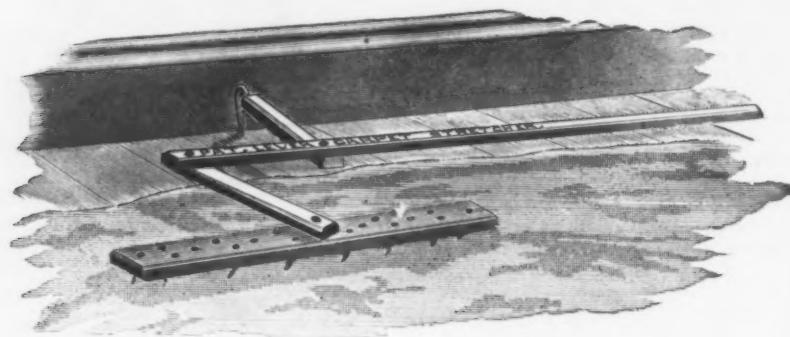
Sure-Shut Spring Hinge.

This is a new hinge presented to the trade this season for the first time by the Keokuk Novelty Company, of Keokuk, Iowa, who are the manufacturers. The claims made for it are three—simplicity, positive action and adjustability.

*The Sure-Shut Spring Hinge.*

The illustration shows the simplicity of its construction, it having but one more part, aside from the spring, than an ordinary loose pin butt. Its positive action causes it to close the door from every point. Its adjustability enables the ordinary wear of the spring to be taken up by simply press-

Lever, in position for use. It is made of hard wood, the several parts being connected with rivets. There are no castings to break. The method of using it is very simple. The hook is fastened in the floor near the baseboard, the cord is pushed into the carpet and the lever is then pulled

*The Patent Lever Carpet Stretcher.*

ing down on the pintle and turning to the right one notch, which will insure its shutting a door as effectively after months of wear as on the first day of use. Seven feet of wire are used to each pair, making an unusually large and long coil. Any

until the carpet is sufficiently stretched for tacking. The length of the lever and its method of side action enable the operator to work at the side of a breadth of carpet, instead of standing immediately on it and pulling the weight of his body

two hinges make a pair, each being constructed to work equally well for right and left doors.

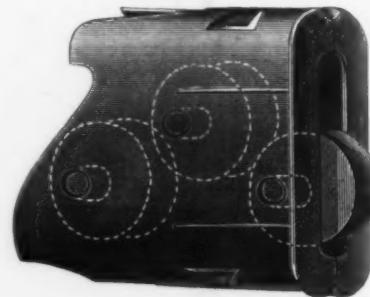
Patent Lever Carpet Stretcher.

The illustration herewith given shows a new carpet stretcher, called the Patent

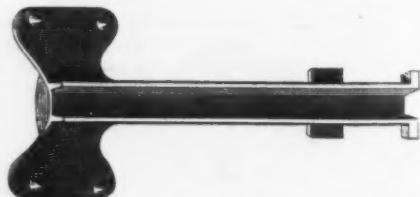
with the carpet. It can be used either on the right or left. It is warranted to pull 500 pounds and will not tear the carpet, as it catches in two or more warps. Its simplicity enables it to be sold at a very low rate. H. H. & L. L. Munger, 142 Lake street, Chicago, are general Western sales agents. The manufacturers are the Thompson De Tamble Mfg. Company, 156 Washington street, Chicago.

Ideal Sash Pulley.

The Stover Mfg. Company, Freeport, Ill., are putting on the market the sash pulley represented below, which they designate as the Ideal. The illustration represents its full size, and indicates clearly its construction. It will be seen that each

*Fig. 1.—The Ideal Sash Pulley.*

pulley has three wheels on which the cord is carried. In inserting the pulley it is necessary simply to bore two $\frac{1}{4}$ -inch holes and drive the pulley in place, the pulley being so made that it mortises its own hole, securing a perfect fit in every case and materially economizing labor. The points made in regard to it are, that no screws are required to hold it in place, no time lost in fitting a mortise, that there is no misfit, and that therefore the pulley can be applied with exceptional rapidity. The company also make for use in connection with this pulley the marking gauge represented below. As will readily be perceived, this gauge lays out the work accurately and makes prick-marks for starting the bit, so that with its use there is no liability of boring the holes wrong.

*Fig. 2.—The Ideal Sash Pulley Marking Gauge.*

In using this gauge, as will readily be understood, it is laid in the groove, when a blow of the hammer drives the points in the wood where the holes are to be bored. One of these gauges is furnished with every lot of pulleys, and if the order is for a large quantity a number are included.

The Columbia Iron Works, of Baltimore, is being sadly handicapped by the action of the naval inspectors who test the steel to be used in the Petrel, building at the yard of the company. It was reported to-day that the fourth stem tube for the shaft of the gunboat had been rejected by the inspectors. The work on the boat is, of course, delayed by the rejections. The steel men say they cannot supply better material or offer a more serviceable tube than those rejected.

Myers' Submerged Cylinder Force Pump.

The accompanying illustration, Fig. 1, represents a new submerged cylinder set length force pump, which is being put on

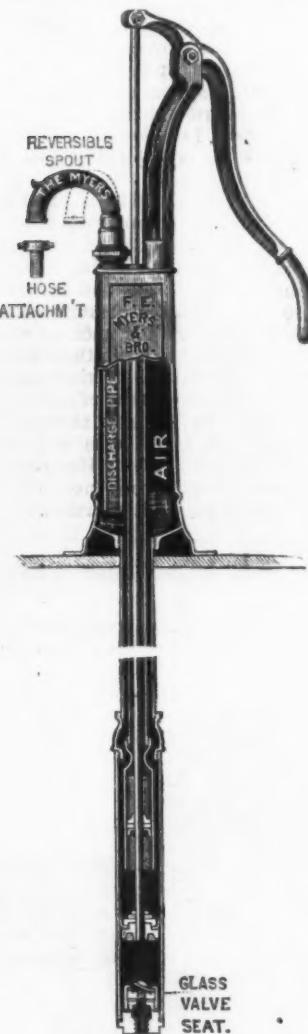


Fig. 1.—Myers' Submerged Cylinder Force Pump, Sectional View.

the market by F. E. Myers & Bro., Ashland, Ohio. The spout of the pump is attached with a union and can be turned either to the right or left in order to adapt

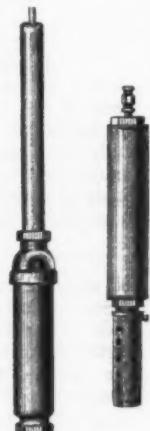


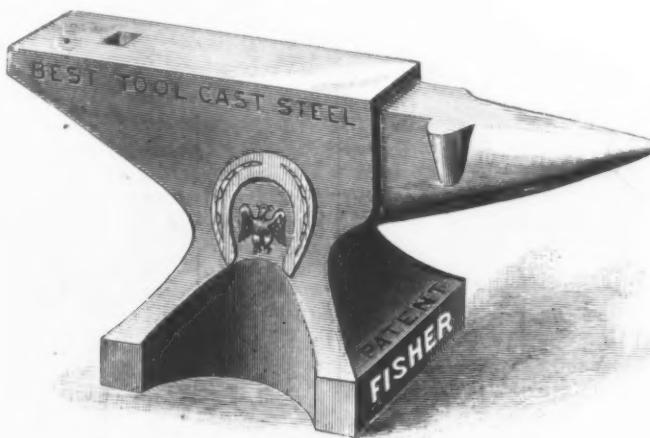
Fig. 2.—Divided Cylinder, for Deep Well Force Pumps.

the pump to different locations. It has, it will be perceived, a large air chamber and a straight watercourse, and is described as throwing an even and continuous stream of water, being alluded to also

as very powerful when the hose is attached. The illustration, Fig. 1, shows plainly the working parts of the pump. The submerged cylinder in which the plunger-bucket operates is seamless drawn brass, and the outer cylinder in which the lift bucket operates is furnished with either seamless drawn brass or porcelain lined iron, as desired. The brass cylinders are fitted with inside attachments and the porcelain cylinders with outside attachments, as shown. The standard is of neat

The New Eagle Horseshoers' Anvil.

The illustration given below represents a new anvil which has recently been put on the market by the Eagle Anvil Works, Trenton, N. J. It is designed especially for horseshoers' use, and is described as made with a solid steel horn, which is long and slim, with side clip in one piece, thus adapting it for horseshoers' work, and is warranted not to break or bend. The manufacturers call attention also to



The New Eagle Horseshoers' Anvil.

design shown, and is tastefully ornamented, and referred to as strong and substantial and serving for an air chamber as mentioned above. These pumps are built under the manufacturers' 1882 drill-well pump patent, and the company claim the credit of being the first parties to introduce to the trade a double-acting pump with uneven cylinders that would go into wells of small diameter. The pump is also made with a divided cylinder for deep wells as represented in Fig. 2. The submerged cylinder in which the plunger bucket operates is made of seamless drawn brass and is placed 5 feet below the base of the pump. The lower cylinder, in which the lift bucket seat, and should be placed near the bottom of the well under the water if possible. In placing this pump in wells the upper and lower cylinders are connected together with intermediate pipe, a $\frac{1}{4}$ inch steel rod inside operating the lift buckets. The pump is referred to as having a strong and substantial stand and good leverage and operating with ease in wells of great depth. It is built with or without wind engine head, and can be placed from the platform. The manufacturers emphasize the advantages possessed by these pumps and the mechanical skill which has been used in their construction.

the fact that it is made with double thick edge, face of best tool-cast steel, which is warranted never to get loose or break off at the tail, not to set or crumple on the edges, and to be of the best temper, keeping its surface hard and true. The dimensions of the anvil are as follows: Face, 15 inches long and $3\frac{1}{4}$ inches wide; solid steel horn 10 inches long, with side clip $1\frac{1}{2}$ inches long; cutter hole $\frac{1}{2}$ -inch square. High claims are made for the quality of these anvils, and it is stated that should any of them prove imperfect in any respect they will be replaced without charge.

Rose Ventilating Window-Sash Lock.

This article, which is manufactured by the Andrus Manufacturing Company, Rochester, N. Y., is represented in the



Rose Ventilating Window Sash Lock.

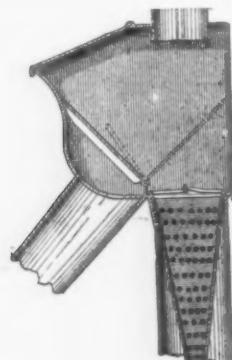
The "Soo" railroad, which extends from Minneapolis to Sault Ste. Marie, is developing into a much more important system than its competitors had anticipated. As it stood originally it was but a link in a transcontinental chain of roads. It has recently consolidated with some other roads, and now embraces several links, which will shortly extend from Sault Ste. Marie to the capital of Dakota, and will exert a very strong influence on the railroad situation in the Northwest. The fact should not be overlooked, however, that this and other roads depending upon Canadian connections occupy a precarious position. The failure of the fishery treaty leaves the way open for complications in our relations with Canada, which may at some time seriously derange railroad intercourse, to the great annoyance, and, at least, temporary embarrassment of roads on both sides of the line.

accompanying illustration. It is intended to fasten the sash at any desired point, thus doing away with the rattling of windows, affording a safe means of ventilation and also tightening the windows so as to keep out dust and cold air, thus serving as a weather strip. The sash locks are referred to as neat in appearance, easily put on, not liable to get out of order and not damaging the finish on the

window. They are made of malleable iron, have no springs, and are put on the market at a moderate price.

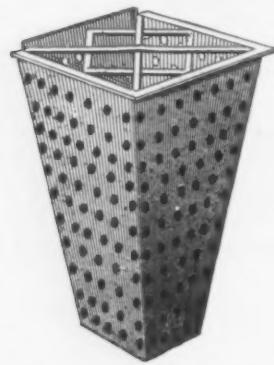
Rain-Water Cut-Off and Filter.

Frank Driller, of Port Jervis, N. Y., is putting upon the market a combined rain-water cut-off and filter, the details of which will be gained by referring to the



Driller's Rain-Water Cut-Off.

accompanying engravings. The first is a sectional view through the complete apparatus. The conductor-pipe leads into the box-shaped apartment at the top and when the water is running to the cistern discharges into a pyramidal-shaped strainer which extends downwardly into the lower pipe. By means of a crank



Enlarged View of Strainer.

which extends outside of the box, and which is indicated by a dotted line in the cut, the valve may be thrown over so as to discharge water into the pipe shown at the left. When the valve is turned over it occupies the position shown by the dotted lines. The second engraving shows an enlarged view of the strainer. As will be noticed by reference to the first engraving, the article is supplied with a flap or lid through which the hand may be passed and by this means the strainer or filter can be taken out for cleaning. The device is simple in its parts, and they are so arranged as to leave small liability of anything getting out of order. Several sizes are manufactured.

New Clapboard and Siding Gauge.

The accompanying engravings contain two views of a new siding or clapboard gauge, which is being introduced by the Stanley Rule and Level Company, 29 Chambers street, New York, and New Britain, Conn. Fig. 2 shows the tool in use and readily suggests the method of application and also indicates the adjustments provided. Beneath the handle there is a flat plate, on the upper edge of

which are provided two prongs, thin at the extreme edges, adapted to be slid up between the boards of two courses. When the wooden handle, by which the gauge is held, is straight with the gauge, there is



Fig. 1.—Stanley's Clapboard and Siding Gauge (Back View).

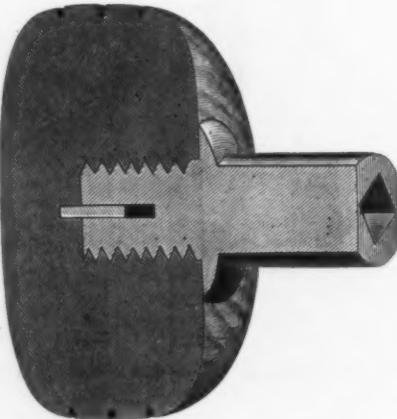
nothing to interfere with these two flat prongs extending upward, as we have described, nor yet to prevent them from being readily withdrawn. The handle, however, serves a double purpose. It is provided with a cam, the effect of which, when the handle is turned either to the right or left, is to push a stud, operating between the two prongs above described, into the wood. This stud is shown projected in Fig. 1 of the engravings; accordingly the gauge is instantly fastened in place by simply turning the handle to either side as above mentioned. The hole made in the wood by the stud is smaller than a nail hole and is at a point that causes it to be readily stopped up by paint. The gauge is adjustable, as will be seen in both engravings. A graduated scale is provided and the two sections are held together by a wing nut. The bayonet-shaped portion at the top forms a rest for the clapboard that is to be put in place. This is one of the simplest and most effective tools for the purpose that we have seen, and we risk nothing in predicting a large demand for it. The makers recommend a full set, or three gauges, for ordinary work.

The four-masted ship *Palgrave*, at this port from Glasgow, is said to be the largest iron sailing vessel in the world. She

measures 322 feet 5 inches from stem to stern. She has 49 feet beam, and 25 feet 4 inches depth of hold. With her cargo of 6711 tons she draws 23 feet of water aft, or about 22 feet 7 inches mean draft. Her lower masts, topmasts and bowsprit are made of steel. The latter is short, no jibboom being carried on it, and only three head sails are set from it. In addition to five wire shrouds forming the lower rigging there are two cap or masthead shrouds, and also two cap backstays to hold the steel topmasts firmly in place. The main-yard is of steel, 106 feet long. All other yards except the topgallantsail, royal and skysail are also made of steel. The shrouds and backstays are set up by the turnbuckle process. The crew, numbering 42 all told, live in the forward part of the poop or iron deck house, which begins between the main and mizzen masts and extends aft about 50 feet. With a steam donkey engine the *Palgrave*'s 3-ton anchors are hove up and her topsail yards mastheaded. She has two wheels, and her steering apparatus is somewhat similar to that of a steamship. From the deck to her main skysail truck, the highest point, it lacks only a few inches of being 300 feet. Her registered gross tonnage is 3174 tons, net 3078 tons. Her carrying capacity is enormous.

Improved Wood Door Knobs.

J. Bardsley, 59 Elm street, New York, is putting upon the market a line of wood



Improved Wood Door Knob.

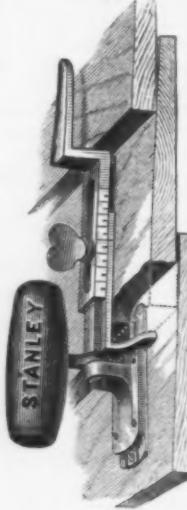


Fig. 2.—Clapboard and Siding Gauge in Use.

door knobs, the constructive features of which are illustrated by the accompanying sectional view. The cut illustrates the patent method of fastening the shank to the head of the knob. It will be seen that the shank is provided with a thread and is screwed into place in the usual manner. This done, a small metal key is forced into the wood through the aperture of the shank. This securely locks the parts together. The construction is such that the maker feels safe in warranting the goods fully.

It is announced that the construction of the Chicago and South-Side elevated railroad will be under the direction of Col. Goddard and Engineer D. H. King. The former built the New York City and Northern extension of the New York elevated railroad, a suburban branch of the main line that crosses the Harlem river and runs for some distance on an elevated structure before ascending to ground level near High Bridge. Col. Goddard and Mr. King are well-known experts in elevated railway building, both of them having been consulted as to the engineering problems presented by the different methods employed in building such structures. A contract for the ironwork

and actual construction of the Chicago railway has been made with Messrs. Bartlett & Heyward, of Baltimore, and it is likely that the Pullman Company, which built the first cars used on the New York elevated road, will be asked to furnish the equipment, which is to be of the very highest class. The manufacture of the material necessary to build the road is to be begun at once, and the engineers of the company are confident that the Chicago "L" road will be in operation to Thirty-ninth street before the end of January, 1889.

Stewart Wheel Hand Lawn Rake.

Whitman & Barnes, 126 Main street, Cincinnati, are putting on the market the lawn rake named above and represented in the accompanying cut, which indicates its special features and construction. It will be seen that the rake is pushed instead of being pulled, permitting the operator readily to see the work that he is doing. The manner in which the teeth can be raised to permit the grass to be dumped is indicated in the engraving. The teeth are described as set closely, so that the loose grass, leaves and small sticks that would be missed by an ordinary rake are picked up without cutting or tearing the sod. The weight of the rake is 12½ pounds and there are 24 inches between



The Stewart Wheel Hand Lawn Rake.

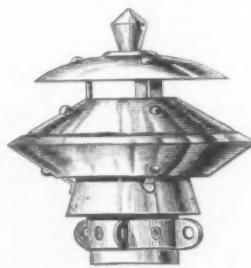
wheels. That it is light-running and simple in operation are points made in regard to it.

It is announced that all necessary arrangements have been made for the thirteenth annual convention of the Amalgamated Association of Iron and Steel Workers, and it promises to be one of the most important ever held by that organization. The convention will open in Pittsburgh on the first Tuesday in June, and will probably continue in session for ten days or two weeks. It is expected that more delegates will be present and more mills represented than ever before, as the association has been considerably strengthened during the past year. As is well known, the present scale, which expires on July 1, calls for \$5.50 per ton for boiling on a 2-cent card. The various lodges have forwarded to Secretary Martin of the Amalgamated Association their suggestions for the next year's scale, which that gentleman has on file in his office. The greatest secrecy is maintained by everybody interested as to what these suggestions are, but it is understood that no advance has been asked on the present scale, and any attempts made by the manufacturers looking to a reduction will be vigorously opposed. From the fact that the manufacturers have not as yet held any conferences on the subject, it is, of course, impossible to say whether they will agree

to a renewal of the scale now in force or whether they will demand a reduction on it. It is believed that they will take no action in the matter until the fate of the Mills bill, now before Congress, has been decided. Should this bill be passed there is no question but that they will demand a very considerable reduction on the present scale, while, if it is defeated, it is possible that no reduction will be asked.

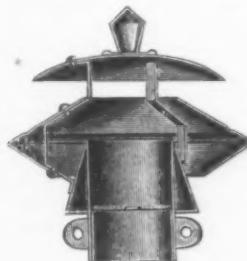
Electric Ventilator.

Reardon & Ennis, 311 River street, Troy, N. Y., are putting upon the market a new form of ventilator which they have



Electric Ventilator, Outside View.

named the Electric. An illustration of it is shown in one of the accompanying cuts, while the other represents a vertical section. The makers inform us that they have endeavored in this ventilator to overcome the serious defects in other forms of ventilators, such as making the ventilator too close. They state that there are ventilators which are practically useless when there is no wind blowing, and this happens in summer time when there is the greatest need of ventilation. Some ventilators, again, they assert, work well for a while, but ultimately clog up with soot. In still others no provision is made for the removal of condensation, which, collecting in the ventilator, soon rusts it out. The form of this ventilator, they assert, is one that will not offend ideas of beauty, while, at the same time, it is believed to be of the greatest utility. The ventilator is manufactured in various sizes. The statement is made that it went successfully through the blizzard which visited the Eastern country the second week in March and gave perfect satisfaction. A feature of the ventilator is the metal collar with lugs at the base of the shaft. This is introduced for the purpose of attaching guys, by which it is held in



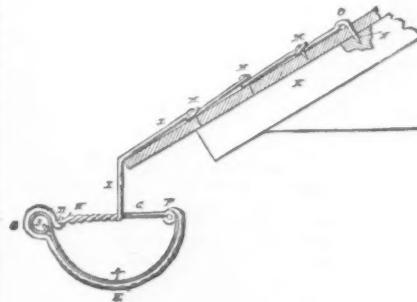
Sectional View.

place above the roof. Referring to the cuts it will be seen that the ventilator consists, essentially, of a hood extending in the shape of a pair of double cones, the bases of which are placed as shown. A sectional view shows its internal construction where the ventilator or smoke-pipe is placed within the double cones and the mouth protected from adverse winds or storms. The inclined sides of the double cones act on the outside to facilitate the action of the wind and on the inside to assist the escape of

smoke and gas. Any snow or ice that may fall on the outside will readily pass off, and any condensation that collects on the inside will find an easy escape. A strong framework of iron holds the different parts together. The makers assert that the frame of the ventilator is such that in whichever direction the wind blows an exhaustion of the ventilating-pipe is produced. They also direct attention to the large area of opening for the escape of smoke or heated air.

The Bell Eave-Trough Hanger.

The accompanying engraving represents a new eave-trough hanger, which is being put upon the market by John W. Bell & Co., Mercer, Pa. The device is the invention of George Reznor, and was patented several years since. As will be gained from an inspection of the cut, the device is made of wire, Nos. 11 and 12 wire being used, according to the size of the hanger. The means that are employed for causing the hanger to grasp the gutter, and also the shape which is given to the upper wire for fastening against the roof boards, will be readily gained from an inspection of the cut. From the circular of the manufacturer we learn that the device is made of one piece of wire, galvanized, and that in putting upon the trough the hanger is fastened in place by simply closing down the hook while the trough is



The Bell Eave-Trough Hanger.

on the ground. For this purpose a pair of ordinary gas-fitters' pliers is a suitable tool. When the trough is elevated to its place the hangers are bent and adjusted to the pitch of the roof, so as to give the trough the proper fall. It is then fastened in place, as shown in the cut. It is claimed that the hanger forms a complete brace and support to the trough, and that it can be put on and fastened and adjusted so rapidly as to accomplish an important saving of time over the use of others with which it may be compared. The hanger is put up two dozen in a package, and is handled by the jobbing trade generally.

The resignation of P. H. Miller as assignee of Graff, Bennett & Co., at Pittsburgh, has been accepted by the Court of Common Pleas, No. 2, and Hon. John H. Bailey has been appointed in his place.

W. P. Williams, Jr., member of the American Society of Civil Engineers, and engineer of the Nicaragua Canal Company, who recently arrived from Panama, says the American contractors at the canal are the only ones who have employed laborers of high intelligence, and the vigor of their work is in marked contrast with that of the other classes of labor.

The Persian Government in addition to sending a minister to this country has determined to appoint a consul general to reside in New York. An American resident of that city will probably be chosen.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.	19.3
Florin (Netherlands).	40.2
Florin (Austria).	35.9
Milreis (Portugal).	1.08
Milreis (Brazil).	54.6
Mark (Germany).	23.8
Kilogram.	220.5
Picul.	134.

EAST INDIES.

SINGAPORE, May 1, 1888.—*Tin.*—No shipments have been made from the Straits Settlements to the United States in April; while last year 250 tons were shipped to England, the April shipments amounted to 1100 tons, as compared with 1300 tons in 1887. During the first four months 650 tons have been shipped to the United States, against 1700 last year, and to England 8900 tons, against 4500.—*Gilligan, Wood & Co., per cable to Charles Nordhaus, New York.*

MANILA, April 30, 1888.—*Hemp.*—At present the nominal price for Hemp is \$8.25 per picul, against \$8.50 a year ago, equaling £28.6/ cost and freight per ton, against £28.10/. Since last cable there were cleared for the United States 13,000 bales, against none last year; since January 1, 70,000, against 76,000. Loading for ditto, 4000, against 16,000. Clearances for England since January 1, 109,000, against 78,000. Loading for ditto, 13,000, against none. Cleared for all other ports, 27,000, against 13,000. Receipts at all ports since last cable, 17,000, against 12,000; ditto since January 1, 201,000 bales, as compared with 151,000 in 1887 and 124,000 in 1886. Freight, \$5. Exchange, 3/6, against 3/5.—*Ker & Co., per cable direct to Charles Nordhaus.*

SPAIN.

BILBAO, April 21, 1888.—*Iron Ore.*—The market has been unaltered during the week, Rubios remaining firm at 7/ @ 7/3, and Campañil at 7/9 @ 8/. There is a good deal of inquiry, for the latter in particular, but not a single contract that we know of has been made during the week. Quite a number of steamers arrived, and have been promptly dispatched. Shipments sum up since January 1, 1,175,445 tons, as compared with 1,372,820 same time last year. *Pig Iron.*—Only 50 tons have been exported and 420 shipped coastwise. The Vizcaya Company's quotations are to-day 60 pesetas or francs per ton for No. 1 to 3, and 57 for No. 4 to 7, f.o.b. here; for contracts for the year, 58 and 55 respectively; Lingotillo delivered at Huelva or Seville 65, analysis warranted.—*Bilbao Marítimo y Comercial.*

GERMANY.

HAMBURG, April 28, 1888.—*Iron.*—The Rhenish-Westphalian market has been more active at figures 10 marks per ton higher than they were in July last year. There is a better demand for Spiegel for American account. Finished is also doing better; the demand for building purposes has set in vigorously. The demand for Finished during the entire winter has been livelier than it usually is, in spite of the bad weather, stocks being reduced in dealers' and consumers' hands. The trade in Thin Sheets, on the other hand, remains slack. The reverse is the case with Boiler Plates and all Thick Sheets, makers stipulating eight weeks' delivery for any sales effected. The Wire branch has no reason to complain of the domestic demand, whereas the export trade therein is restricted by foreign competition. Prices for export are correspondingly depressed. Steel works are fully booked for the present, with good prospects for the near future, as domestic railroads will require large amounts of material and will keep makers busy during the summer. Car shops have extensively contracted to furnish Freight Cars to the Prussian Government lines. Machine shops, foundries, boiler-makers and structural ironworks all report favorably, and so do the bridge-building concerns, orders increasing in the hands of all of them. The building of Iron sheds, &c., for the new customs districts of Hamburg and Bremen also come in for a share in the activity. Now that the inundations have ceased, Upper Silesia is also reviving, Pig Iron being in brisk demand and tending upward. Both foundries and machine shops receive plenty of commands from the mining districts. Both rolling mills and steel works are busily engaged. *Metals.*—Have been quiet and in an expectant attitude, awaiting fresh developments, distrust of ruling high figures causing consumers to buy from hand to mouth merely. The Mecklenburg Lead Company have declared a 16% dividend for 1887, against 15 in 1886; it is the largest for the past 20 years. Its product was 23,199 tons. Pig Lead, against 22,809 in 1886 and 7803 kg. Silver, against 6145.—*Borsenhalde.*

FRANCE.

PARIS, April 28, 1888.—*Metals.*—Our market has been stagnant and unsettled in consequence of the panicky condition of the Tin market that has begun to set in. *Copper* is still nominally the same as last week, for *Tin* there is no quotation. *Lead* remains steady and *Spelter* has given way 2.50 francs. We quote at the close, *Copper*, Chili Bars, 200 @ 205 francs per 100 kg.; *Ingots and Slabs*, 202.50; *Best Selected*, 207.50; and *pure Corocoro Ore*, 180. *Lead*, 36.50 @ 37, and *Spelter* 49 @ 49.50. *Iron*—Seems to be on the eve of a slight improvement once more; Northern makers exhibit more nerve and steadiness, and the dealers in this city have been encouraged in consequence to raise their figures 50 centimes per 100 kg. This establishes *Beams* at 14 francs and *Merchant Iron* at 15. This advance, moreover, seems justified in view of the higher cost of raw material in the Iron districts and the advent of the building season here which, if it does not promise to be anything extraordinary, still bids fair to be tolerably active.—*Moniteur des Intérêts Matériels.*

BELGIUM.

BRUSSELS, April 28, 1888.—*Iron.*—Although activity has slightly diminished during the week in the Belgian Iron districts, the outlook remains fair, to judge from the inquiries coming in from all quarters, causing continued firmness and the near future to be looked upon as being promising. *Pig Iron* remaining scarce and firm, *Finished* is correspondingly strong. *Steel works*, though by no means engaged to the extent of their capacity, remain satisfactorily booked. *Cockerill*, among others, received several fresh orders during the past ten days. *Angleur* turns out *Thomas* abundantly and finds no difficulty in placing the same. *Augrée* is booked for two months to come, and some 18,000 *Steel Rails* are to be adjudicated upon for the Government and branch railways without delay. *Machine shops* are about the only branch complaining of dull times just at present. There is a good deal of talk of the *Charleroi* blast furnaces being about to substitute *Moselle Iron Ore* for *Luxembourg*. Out of 50 blast furnaces in Belgium 31 were blown in and 19 blown out in April.—*Moniteur Industriel.*

In commenting on the fine imposed by Justice Forsaith on Thomas Flynn, a striking marble cutter in Boston, who called several non-union employees "scabs," the *Commercial Bulletin*, of that city, says: "It is a self-evident truth, and one of the first principles of liberty, that a man may fix a price for his own labor. The right has been admitted over and over again, and applies, as well to the workman who chooses not to join a Knight of Labor or trade union society as to members of such organizations. Yet the latter are unwilling to grant to others the same liberty they claim for themselves. A workman who dares work for a less sum than they have fixed, no matter how sound his reasons may be for so doing, runs the risk of personal assault and injury as well as the reception of every species of insult and vituperation that can be heaped upon him. The commonest species of blackguardism is to call a mechanic who is not a trades union man a 'scab.' This opprobrious epithet, sensational newspapers of the day hasten to adopt to please their trades union readers; and great head lines are paraded in their columns, such as 'Four Scabs Beaten on their Way to Work,' 'Strikers Firm—Scabs Warned Off,' &c., and the aid of a portion of the press is thus brought in to crush honest, temperate and industrious workmen. Many and many have been the occasions, as heads of great industrial establishments will bear witness, when well-paid and perfectly satisfied workmen have been compelled to sacrifice good positions and suffer for the want of needful comforts in their families, because of outrages and annoyances they would be subjected to did they not comply with the demands of trades union leaders. The righteous decision of Justice Forsaith, which we trust will be sustained, will go far toward sustaining the independent workman in his rights, and protect him, not only from personal assault, but from public insult and abuse from those who presume to question his right to fix his own wages."

More Iron Works in the Northwest.

The development of the Gogebic and Vermillion ranges has naturally drawn attention to the possibilities of iron manufacture at the head of Lake Superior. In addition to the charcoal blast furnace in operation at Ashland, Wis., the erection of a manufacturing plant is in contemplation. Last week we referred to a proposed iron-pipe works and blast furnace at West Superior, Wis., and now the Duluth Iron and Steel Company have begun the construction of a blast furnace at Duluth. From John Birkinbine, of Philadelphia, who is the engineer of the Duluth Iron and Steel Works, we learn that the plans which he has prepared embrace a twin blast furnace plant. The furnaces are to be 16 x 75 feet, each equipped with three regenerative hot-blast stoves. There will be 20 boilers and three blowing engines. The blowing engines, condensers, pumps, electric light plant and hoisting engines will all be placed in one building. Raw coal will be brought to the works by water during the navigation season, and coke will be made on the ground. As the ores will be brought either by rail or water, the charge will be made up at the stock-house level and elevated by inclined planes to the tunnel heads of the furnaces. The buildings for the twin plant will be erected at once, but the contracts for the ironwork and machinery of but one furnace will be let at present. Some of these contracts have been placed and work on them commenced. The grading of the site is practically completed and the masonry will be started in a few days, the backwardness of the season having retarded outdoor work. The exact location of the plant is on St. Louis Bay about four miles from the Union Depot of Duluth, and in anticipation of the demand which will be created for workmen and their requirements building operations in the vicinity are quite active. The company will probably convert the output of their furnaces into some more advanced form of manufacture, but are not as yet prepared to announce the direction which their contemplated operations will take. The capital to be invested in this new enterprise is almost entirely Northwestern, the aggressive business men of that section having the strongest faith in its future. Their success in other undertakings leads them to believe that the manufacture of iron and steel can be profitably conducted, with not only excellent facilities for bringing together the necessary raw materials, but an expanding market in which to dispose of the product. The work of construction will not be pushed with excessive haste, however, and the first furnace is not expected to be ready for operation under a year. This will obviate the necessity of laying in a stock of fuel this summer to be carried through the greater part of the winter. An indication of the cheapness with which fuel can be transported to Duluth is shown in a contract recently made by other parties for the carriage of 100,000 tons of coal at 65 cents per ton from Cleveland to Duluth.

During the last few years the marine engines made in Detroit, Mich., have acquired an excellent reputation. Among the principal firms in this line are the Dry Dock Engine Works, the Riverside Iron Works and the Frontier Iron Works. Since the opening of navigation in 1886, these firms have built 21 triple expansion engines, 20 fore and aft compounds and nine steeples, besides transforming 18 old engines into compounds. The largest engine was built for the steamer *Hudson* by the Dry Dock Company, the cylinders being 23, 36 and 62 by 48 inches.

CURRENT HARDWARE PRICES.

MAY 9, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.

Caps, Ferrousion, W. 1000—

Hicks & Goldmark's

F. L. Waterproof, 1-10's.	50¢	dis 25@
E. B. Trimmed Edge, 1-10's.	65¢	25@
E. B. Ground Edge, Central Fire, 1-10's.	70¢	75¢
Double Waterproof, 1-10's.	31.40	74¢
Musket Waterproof, 1-10's.	62¢	53¢
G. D.	28¢	
S. B.	30¢	

Union Metallic Cartridge Co.

F. C. Trimmed.	50¢	
F. L. Ground.	65¢	dis 25@
Cen. Fire Group.	70¢	25@
Double Water-proof.	31.40	74¢
Double Water-proof, in 1-10's.	31.40	

S. B. Gemini Imported.

Mey's E. F.	45¢	
Mey's L. Waterproof, Central Fire.	54¢	58¢

Cartridges.

Rim Fire Cartridges.	dis 50@52@
Rim Fire Military Cartridges.	dis 15@22@
Cen. Fire Cartridges, Pistol and Rifle.	dis 25@52@
Cen. Fire Carr., Military & Sporting.	dis 15@52@
Blank Cartridges, except 22 and 32 cal., an additional 10% over above discounts.	
Blank Cartridges 22 cal.	31.75
Blank Cartridges, 32 cal.	33.50
Primed Shells and Bullets.	dis 15@52@
B. B. Caps, Round Ball.	31.75
B. B. Caps, Conical Ball, Swaged.	32.00

Primers.

Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells).	\$1.00
All other Primers, all sizes.	\$1.20

Shells.

First quality, 4, 8, 10 and 12 gauge.	dis 25@10@2
First quality, 14, 16 and 20 gauge (\$10 list).	dis 30@10@2

Star, Club, Rival and 10 gauge, \$9 list.	dis 33@10@2
Climax Brands, 12-gauge, \$8 list.	2%
Club, Rival and Climax Brands, 14, 16 and 20 gauge.	dis 30@10@2
Seibold's Combination Shot Shells.	dis 15@22@
Brass shot Shells, 1st quality.	dis 60@2
Brass shot Shells, Club, Rival & Climax.	dis 65@2

Shells Loaded.

List No. 19, 1887.

Wade.	dis 20 & 10 %
O. M. C. & W. R. A. - B. E., 11 up.	\$2.00
U. M. C. & W. R. A. - B. E., 9@10.	2.30
U. M. C. & W. R. A. - B. E., 7@8.	2.30
U. M. C. & W. R. A. - P. E., 11 up.	3.10
U. M. C. & W. R. A. - P. E., 9@10.	4.00
U. M. C. & W. R. A. - P. E., 7@8.	4.90
Mey's E. E., 11 up.	\$1.75
Mey's P. E., 11 up.	\$2.80

Anvils.—Eagle Anvils.

Wright's.	\$1.40
Armitage's Mouse Hole.	11@11@14

Armitage Mouse Hole, Extra.

Trenton.	\$1.40@9@14
Wilkinson's.	9@10@16@

J. & Riley Carr, Patent Solid.

Wadell Vise and Drill—	
Millers Falls Co.	\$18.00
Cheney Anvil and Vise.	dis 20 %
Allen Combined Anvil and Vise.	\$3. dis 40@10 %
Moore & Barnes Mfg. Co.	dis 33@4 %

Anglers and Bits.

Douglas Mfg. Co.

New Haven Copper Co.

Wm. A. Ives & Co.

Humphreysville Mfg. Co.

French, Swift & Co. (F. E. Beecher)

Cook's, Douglass Mfg. Co.

Cook's, New Haven Copper Co.

Ives' Circular Lip.

Patent Solid Head.

C. E. Jennings & Co., No. 10, extension 1'p.

C. E. Jennings & Co., No. 30.

C. E. Jennings & Co., Auger Bits, in fancy boxes.

T set, 32@4 quarters, No. 5; No. 3, E.

Lewis' Patent Single Twist.

Russell Jennings' Augers and Bits.

Ives' Circular Lip.

Imitation Jennings' Bits (new list).

Cook's, New Haven Copper Co.

Pugh's Black.

Car Bits.

L'Hommedieu Car Bits.

Forster Pat. Auger Bits.

Hollow Augers—

Ives'.

French, Swift & Co.

Douglas'.

Bonney's Adjustable 1/2 doz. \$48.

Ives' Expansive, each \$4.50.

Universal Expansive, each \$4.50.

Wood's.

Clark's small, \$18; large, \$26.

Ives' No. 4, per doz., \$60.

Swan's.

Steer's, No. 1, \$20; No. 2, \$25.

Stearns' No. 2, \$18.

dis 20

Blind Bolts.

Mackrell's.

Common.

Diamond.

" Bee".

Double Cut, Shepardson's.

Double Cut, Ct. Valley Mfg. Co.

Double Cut, Hartwell's, \$20.

Double Cut, Douglass'.

dis 10@10@5

Double Cut, Ives'.

dis 60@60@5

Morse Twist Drills.

Standard.

Cleveland.

Syracuse, for metal.

Syracuse, for wood (wood list).

Williams' or Holt's, for metal.

Williams' or Holt's, for wood.

dis 40@10@5

Ship Auger Bits—

L'Hommedieu's.

Watrous'.

Snell's.

Snell's Ship Auger Pattern Car Bits.

dis 15@10 %

Awl Heads.

Sewing, Brass Ferrule.

Patent Sewing, Short.

Patent Sewing, Long.

Patent Peg, Plain Top.

Patent Peg, Leather Top.

dis 12.00 per gross.

dis 45@10 %

Awl Heads.

Sewing, Brass Ferrule.

Patent Sewing, Short.

Patent Sewing, Long.

Patent Peg, Plain Top.

Patent Peg, Leather Top.

dis 12.00 per gross.

Awl Heads.

Sewing, Brass Ferrule.

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Patent Peg, Plain Top.

Patent Peg, Leather Top.

dis 12.00 per gross.

Awl Heads.

Sewing, Brass Ferrule.

Patent Sewing, Short.

Patent Sewing, Long.

World's Best. ♦ gross, No. 1, \$12.00; No. 2, \$24.00 No. 3, \$36.00	dis 50 & 10 %
Universal	♦ dos \$5.00, dis 35 & 5 %
Domestic	♦ dos \$2.50, dis 45 %
Champion	♦ dos \$2.00, dis 50 %
Cards.	
Horse and Curry.	dis 10 @ 10 & 10 %
Cotton.	New list, Aug. 1, 1883, dis 10 %
Wool	dis 10 %
Carpet Stretchers.	
Cast Steel, Polished.	♦ dos \$1.25
Cast Iron, Steel Points	♦ dos 80¢
Secket	♦ dos \$1.75
Ballard's.	dis 25 @ 25 & 10 %
Carpet Sweepers.	
Bissell 6. 1/2	♦ dos \$1.75
Bissell No. 7 New Drop Pan	♦ dos \$19.00
Bissell Grandpa	♦ dos \$36.00
Grand Rapids	♦ dos \$24.00
Crown Jewel.	No. 1, \$18; No. 2, \$10; No. 3, \$20
Magic	♦ dos \$15.00
Jewel	♦ dos \$17.00
Mystic	♦ dos \$16.00
Cottage	♦ dos \$15.00
Garland	♦ dos \$18.00
Parlor Queen	♦ dos \$24.00
Housewife's Delight	♦ dos \$16.00
Queen	♦ dos \$18.00
Queen, with band	♦ dos \$30.00
King	♦ dos \$18.00
Weed Improved	♦ dos \$16.00
Hub	♦ dos \$16.00
Cog Wheel	♦ dos \$16.00
Cartridges.—See Ammunition.	
Casters.	
Bed) New list:
Plate.	Brass, dis 55 @ 55 & 5 %
Shallow Socket.) Others, dis 60 @ 60 & 5 %
Deep Socket.	dis 40 & 10 %
Yale Casters, list May, 1884	dis 30 @ 10 & 40 %
Yale, Gen.	dis 60 @ 60 & 5 %
Martin's Patent (Phoenix).	dis 45 @ 10 @ 50 %
Payson's Anti-friction	dis 60 @ 60 & 10 %
" Giant" Truck Casters.	dis 10 @ 10 & 5 %
Stationary Truck Casters.	dis 45 & 10
Cattle Leaders	
Humason, Beckley & Co.'s.	dis 70 %
Sargent's.	dis 65 @ 65 @ 10 %
Hotchkiss.	dis 30 %
Peck Stow & W. Co.	dis 50 & 10 %
Chain.	
Trace, 64-10-2, exact sizes, ♦ pair, \$1.05	dis 50 & 10 & 5 %
Trace, 64-13-3, exact sizes, ♦ pair, .02 @ 50 & 10 & 7 %	dis 50 & 10 & 7 %
Trace, 7-10-2, exact sizes, ♦ pair, 1.11 @ 50 & 10 & 7 %	dis 50 & 10 & 7 %
Note.—Traces, "Regular" sizes 36 net \$ per pair less than 100 ft.	
Low Fifth, Stretcher, and other Trace Chains, list Nov. 1, 1884	dis 50 & 10 @ 50 & 10 & 5 %
American Coll. 3-18	dis 5.14 @ 5.14 @ 5.14
In cast lots, 9.00 6.30 5.25 4.00 4.40 4.20 3.95 3.75	
Less than cast lots, add 4¢ @ 4¢ per lb.	
German Coll. list of June 20, 1887	dis 50 & 10 & 50 & 10 %
Gen. Halter Chain, list of June 20, 1887	
Covert Halter, Hitching and Breast.	dis 50 & 10 %
Covert Traces.	dis 35 @ 2 %
Oneida Halter Chain.	dis 60 @ 60 & 5 %
Galvanized Pump Chain.	dis 60 @ 60 & 6 %
Jack Chain, Iron.	dis 70 & 10 @ 70 %
Jack Chain, Brass.	dis 65 @ 70 %
Chalk.	
White.	♦ gro 50¢
Red.	♦ gro 70¢
Blue.	♦ gro 85¢
White Crayons.	♦ gro 12¢ @ 12¢ dis 10¢
Chalk Lines.—See Lines.	
Chiseels.	
Soccket Framing and Firmer.	
F. S. & W.	dis 75 & 5 @
New Haven and Middlesex.	75 & 10 %
Mix.	
Buck Bros.	dis 90 %
Merrill.	dis 60 @ 60 & 10 %
L. & J. White.	dis 30 @ 30 & 5 %
Witherby and Douglass.	dis 75 @ 75 & 5 %
Tanged Firmer.	dis 40 & 10 %
Tanged Firmer, Butcher's.	dis 75 @ 75 & 5 %
Tanged Firmer, Spear & Jackson's.	dis 50 @ 50 %
Tanged Firmer, Buck Bros.	dis 30 @ 30 %
Cold Chisels, ♦.	16¢ @ 16¢
Chucks.	
Beach Patent.	each, \$8.00, dis 20 %
Morse's Adjustable.	each, \$7.00, dis 20 @ 20 & 5 %
Danbury.	each, \$6.00, dis 30 @ 30 & 5 %
Syracuse, Balz Pat.	dis 25 %
Clamps.	
Provident Tool Co.'s Wrought Iron	dis 25 %
Adjustable, Gray's.	dis 20 %
Adjustable, Lambert's.	dis 20 %
Adjustable, Snow's.	dis 40 & 5 %
Adjustable, Hammer's.	dis 15 %
Adjustable, Stearns'.	dis 20 & 10 %
Stearns' Adjustable Cabinet and Corner.	dis 20 & 10 %
Cabinet, Sargent's.	dis 60 & 20 @ 10 %
Carriage Makers', Sargent's.	dis 60 & 20 @ 10 %
Eberhard Mfg. Co.	dis 40 & 10 @ 40 & 10 %
Warner's.	dis 40 & 10 @ 40 & 10 & 5 %
Gaw Clamps.	dis 25 %
Clips.	
Norway Axle, 4 & 5-16.	dis 55 & 25 %
Second grade Norway Axle, 4 & 5-16.	dis 65 & 25 %
Superior Axle Clips.	dis 60 & 25 %
Norway Spring Bar Clips, 5-16.	dis 60 & 5 & 5 %
Wrought-Iron Fellox Clips.	dis 5 & 5 %
Steel Fellox Clips.	dis 5 & 5 %
Cockeyes.	dis 50 %
Cocks. Brns.	
Hardware list.	dis 40 & 10 & 2 %
Coffee Mills.	
Box and Side, List revised Jan. 1, 1888.	dis 50 & 22 %
American, Enterprise Mfg. Co.	dis 20 & 10 @ 30 %
The "Swift," Lane Bros.	dis 20 & 10 %
Compasses, Dividers, &c.	
Compasses, Calipers, Dividers.	dis 70 @ 70 & 10 %
Bemis & Call Co.'s Dividers.	dis 60 & 5 %
Bemis & Call Co.'s Compasses & Calipers.	dis 50 & 5 %
Bemis & Call Co.'s Wing & Inside or Outside.	dis 50 & 5 %
Bemis & Call Co.'s Double.	dis 60 %
Bemis & Call Co.'s (Call's Patent Inside).	dis 30 %
Excelsior.	dis 50 %
J. Stevens & Co.'s Calipers and Dividers.	dis 25 & 10 %
Coopers' Tools.	
Bradley's.	dis 20 %
Barton's.	dis 20 @ 20 & 2 %
L. & J. White.	dis 20 & 2 %
Albertson Mfg. Co.	dis 25 %
Beatty's.	dis 40 @ 40 & 5 %
Sandusky Tool Co.	dis 30 @ 30 & 5 %
Corkscrews.	
Humason & Beckley Mfg. Co.	dis 40 @ 40 & 10 %
Clough's Patent.	dis 33¢ @ 33¢ dis 10¢
Howe Bros. & Hubert.	dis 35 %
Corn Knives and Cutters.	
Bradley's.	dis 10 %
Wadsworth.	dis 25 %
Cradles.—Grain.	dis 50 & 10 %
Crew Bars.	
Cast Steel.	♦ B 45
Iron, Steel Points.	♦ B 34¢
Curry Combs.	
Fitch's.	dis 50 & 10 @ 50 & 10 & 10 %
Rubber.	♦ dos \$10.00, dis 20 %
Perfect.	dis 50 %
Curtain Pins.	
Silvered Glass.	net
White Enamel.	net
Cutlery.	
Beaver Falls and Booth's.	dis 33¢ @
Westonholme.	\$7.75 to \$2
Dampers, &c.	
Dampers, Buffalo.	dis 50 %
Husky, Damer Clips.	dis 40 %
Crown Camper.	dis 40 %
Excelsior.	dis 40 & 10 %
Dividers—See Compasses	
Drawing Collars.	
Embossed Glass.	
Leather, Pope & Stevens' list.	dis 30 & 10 %
Brass, Pope & Stevens' list.	dis 40 %
Doey Springs.	
Torrey's, Rock, regular size.	♦ Cm. L. 30
Gray's.	♦ gro \$20.00, dis 20 %
Bee Hod.	♦ gro \$20.00, dis 20 %
Warner's No. 1, ♦ dos \$2.50; No. 2, \$1.30 dis 40 & 10 @ 50 %	♦ gro \$20.00, dis 20 %
Gem Coll., list April 19, 1886.	dis 10 %
Star (Coll.), list April 19, 1886.	dis 20 %
Victor (Coll.).	dis 60 @ 60 & 10 %
Philadelphia.	dis 60 @ 60 & 10 %
Cowell's.	dis 1.00, ♦ dos \$18.00; No. 2, \$15.00, dis 50 %
Hercules.	dis 50 %
Shaw Door Check and Spring.	dis 25 @ 30 @ 35 %
Elliott's Door Check and Spring.	dis 25 @ 25 %
Drawing Knives.	
F.	dis 75 & @
Mix.	75 & 10 %
New Haven and Middlesex.	
Merrill.	dis 60 & 10 @ 10 %
Witherby and Douglass.	dis 75 & 75 & 5 %
Watson.	dis 15 @ 10 @ 20 %
Edgell's.	dis 20 @ 25 %
Adjustable Handie.	dis 25 @ 25 %
Wilkinson's Folding.	dis 25 @ 25 & 5 %
Or'l'ins and Drill Stocks.	
Blacksmiths'.	each, \$1.75
Blacksmiths' Self-Feeding.	each, \$7.50, dis 20 %
Brest, P. S. & W.	each, \$10.00 dis 20 %
Brest, Wilson's.	each, \$10.00 dis 20 %
Brest, Miller's Falls.	each, \$10.00 dis 20 %
Brest, Bartholomew's.	each, \$2.50, dis 25 @ 40 %
Ratchet, Merrill's.	dis 20 @ 20 & 5 %
Ratchet, Ingersoll's.	dis 25 %
Ratchet, Parker's.	dis 30 @ 20 & 5 %
Ratchet, Whitney's.	dis 20 & 10 @ 20 %
Ratchet, Weston's.	dis 20 & 20 %
Ratchet, Moore's Triple Action.	dis 25 @ 30 %
Whitney's Hand Drill, Plain, \$1.00, Adjustable.	\$1.00
Wilson's Drill Stocks.	dis 20 & 10 %
Automatic Boring Tools.	each, \$1.75 @ \$1.80
Twist Drills.	
Morse.	dis 50 & 10 & 5 %
Standard.	dis 50 & 10 & 5 %
Syracuse.	dis 50 & 10 & 5 %
Cleveland.	dis 50 & 10 & 5 %
Williams.	dis 50 & 10 & 5 %
Drill Bits.—See Augers and Bits.	
Drill Chucks.—See Chucks.	
Dripping Pans.	
Small sizes.	♦ B 7 & 6
Large sizes.	♦ B 6 & 6 %
Egg Beaters.	
Dover.	♦ dos \$2.00
Family.	♦ gro \$17.00 dis 33¢
Family T. & S. Mfg. Co.	♦ gro \$17.00 dis 33¢
Standard (Standard Co.).	♦ gro \$9.00
Kingston (Standard Co.).	♦ gro \$6.50
Acme (Standard Co.).	♦ gro \$16.00
Duplex (Standard Co.).	♦ gro \$18.00
Rival (Standard Co.).	♦ gro \$12.00
Triumph (T. & S. Mfg. Co.).	♦ gro, 10.50 dis 31.50
Advance No. 1.	♦ gro, 10.50 dis 31.50
Advance, No. 2.	♦ gro \$10.00
Bryant's.	♦ gro \$15.00
Ayr's "Spiral."	♦ gro \$12
Blacksmiths' Self-Feeding.	dis 50 & 10 & 5 %
Standard.	dis 50 & 10 & 5 %
Syracuse.	dis 50 & 10 & 5 %
Cleveland.	dis 50 & 10 & 5 %
Drill Bits.	dis 50 & 10 & 5 %
Drill Chucks.	dis 50 & 10 & 5 %
Dripping Pans.	dis 50 & 10 & 5 %
Small sizes.	♦ B 7 & 6
Large sizes.	♦ B 6 & 6 %
Egg Beaters.	
Ebover.	
Family.	♦ dos \$2.00
Family T. & S. Mfg. Co.	♦ gro \$17.00 dis 33¢
Standard (Standard Co.).	♦ gro \$9.00
Kingston (Standard Co.).	♦ gro \$6.50
Acme (Standard Co.).	♦ gro \$16.00
Duplex (Standard Co.).	♦ gro \$18.00
Rival (Standard Co.).	♦ gro \$12.00
Triumph (T. & S. Mfg. Co.).	♦ gro, 10.50 dis 31.50
Advance No. 1.	♦ gro, 10.50 dis 31.50
Advance, No. 2.	♦ gro \$10.00
Bryant's.	♦ gro \$15.00
Ayr's "Spiral."	♦ gro \$12
Double (Hamblin & Russell Mfg. Co.).	♦ gro, \$16.00
Easy (Hamblin & Russell Mfg. Co.).	♦ gro, \$14.00
Triple (Hamblin & Russell Mfg. Co.).	♦ gro, \$16.00
Spiral (Hamblin & Russell Mfg. Co.).	♦ gro, \$14.00
Paine, Dichi & Co's.	♦ gro \$24.00
Electric Bell Mfg.—Wollensack's.	dis 15 %
Bielow & Dowse.	dis 20 %
Kern.	No. 4 to 50 to 100 to 150 to 200 to 250 to 300 to 350 to 400 to 450 to 500 to 550 to 600 to 650 to 700 to 750 to 800 to 850 to 900 to 950 to 1000 to 1050 to 1100 to 1150 to 1200 to 1250 to 1300 to 1350 to 1400 to 1450 to 1500 to 1550 to 1600 to 1650 to 1700 to 1750 to 1800 to 1850 to 1900 to 1950 to 2000 to 2050 to 2100 to 2150 to 2200 to 2250 to 2300 to 2350 to 2400 to 2450 to 2500 to 2550 to 2600 to 2650 to 2700 to 2750 to 2800 to 2850 to 2900 to 2950 to 3000 to 3050 to 3100 to 3150 to 3200 to 3250 to 3300 to 3350 to 3400 to 3450 to 3500 to 3550 to 3600 to 3650 to 3700 to 3750 to 3800 to 3850 to 3900 to 3950 to 4000 to 4050 to 4100 to 4150 to 4200 to 4250 to 4300 to 4350 to 4400 to 4450 to 4500 to 4550 to 4600 to 4650 to 4700 to 4750 to 4800 to 4850 to 4900 to 4950 to 5000 to 5050 to 5100 to 5150 to 5200 to 5250 to 5300 to 5350 to 5400 to 5450 to 5500 to 5550 to 5600 to 5650 to 5700 to 5750 to 5800 to 5850 to 5900 to 5950 to 6000 to 6050 to 6100 to 6150 to 6200 to 6250 to 6300 to 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Best Anti-Friction.	dis 60 \$	Champion Ringers.	dis \$2.00	Ladies.
Duplex (Wood Track).	dis 60 \$	Champion Rings, Double.	dis \$2.25	Melting, Sargent's.
Terry's Patent.	dis doz. dr. 4 in. \$10. 5 in.	Brown's Ringers.	dis \$2.00	Melting, Reading.
812.	dis 50&10 \$	Brown's Rings.	dis \$1.25 @ 1.30	Melting, Monroe's Patent.
Cronk's Patent.	No. 4, \$12; No. 5, \$14.40; No. 6, \$18.60	Holder's Apparatus.	dis 4 \$	Melting, P. S. & W.
Wood Track Iron Clad.	dis 50&10 @ 50&15 \$	"Moore's" Hand Hoist, with Lock Brake.	dis 70	Melting, Warner's.
Carrier Anti-Friction.	dis 50&10 \$	"Moore's" Differential Pulley Block.	dis 4 \$	Lawn Mowers.
Architect.	dis 40 \$	Holders, Tool.	dis 25 \$	Standard List.
Eclipse.	dis 20&10 \$	Baiz Pat.	dis \$4; dis 25 \$	Enterprise.
Felix.	dis 30 @ 30&10 \$	Hollow-Ware.		
Richards'.	dis 40 @ 40&10 \$	Iron.		
Lane's Steel Anti-Friction.	dis 40 @ 40&10 \$	Stove Hollow-Ware, Ground.	dis 60&10 @ 60&10 \$	Fubular, Plain with Guards.
The Ball Bearing Door Hanger.	dis 20&10 @ 25&10 \$	Stove Hollow-Ware, Unground.	dis 70&5 @ 70&10 \$	Fubular, Lift Wire, with Guards.
Warner's Patent.	dis 20 @ 20&10 \$	Enameled and Tinned Hollow-Ware.		Fubular, Square Plain with Guards.
Stearns' Anti-Friction.	dis 20 @ 20&10 \$	Kettles.	dis 70 @ 70&5 \$	Without Guards, 25¢ per dozen less.
Stearns' Cha'tege.	dis 25&10 @ 25&10 @ 10 \$	Oval Boilers, Saucepans & Glue Pots.		Med. 37.25; Large, \$9.75, dis 20 @ 25¢
Faultless.	dis 40 @ 40&10 \$	Agate and Granite Ware.	dis 40 @ 40&10 \$	
American.	dis 40 @ 20&10 \$	Rustless Hollow-Ware.	dis 50 @ 50&10 \$	
Rider & Wooster, No. 1, \$24; No. 2, 75¢.	dis 40 @ 20&10 \$	Galvanized Tea-Kettles.		
Paragon, Nos. 1, 2 and 3.	dis 40 @ 10 \$	Inch... 6 7 8 9		
Paragon, Nos. 5, 5½, 7 and 8.	dis 20 @ 10 \$	Each... 55¢ 60¢ 65¢ 75¢		
Crescent.	dis 60 @ 60 @ 10 \$	Silver Plated—4 mo. or 5% cash in 30 days.		
Nickel-Cast Iron.	dis 40 \$	Reed & Barton.	dis 40&25 \$	
Nickel-Malleable Iron and Steel.	dis 40 \$	Meriden Britannia Co.	dis 40&25 \$	
Scranton Anti-Friction Single Strap.	dis 33¢ 40 \$	Simpson, Hall, Miller & Co.	dis 40&25 \$	
Scranton Anti-Friction Double Strap.	dis 40 \$	Rogers & Brother.	dis 40&25 \$	
Universal Anti-Friction.	dis 40 \$	Hartford Silver Plate Co.	dis 40&52.5 \$	
Harness Snaps. —See Snaps.		William Rogers Mfg. Co.	dis 40&52.5 \$	
Hatchets. —List Jan. 1, 1886.				
Isaiah Blood.	dis 35 @ 40 \$	Heels.		
Hunt's Shingling Lath and Claw.	dis 40&25 \$	Cast Iron.		
Hunt's Broad.	dis 40 \$	Bird Cage, Sargent's List.	dis 60 @ 10 @ 10 \$	
Buffalo Hammer Co.	dis 40 @ 10 @ 50 \$	Clothes Line, Sargent's List.	dis 60 @ 10 @ 10 \$	
Hurd's.	dis 40 @ 10 @ 50 \$	Clothes Line, Reading List.	dis 60 @ 10 @ 60 @ 10 \$	
Fayette R. Plumb.	dis 40 @ 10 @ 50 \$	Ceiling, Sargent's List.	dis 55 @ 10 @ 10 \$	
Wm. Mann, Jr. & Co.	dis 50 @ 50 @ 55 \$	Harness, Reading List.	dis 55 @ 10 @ 10 \$	
Underhill's Edge Tool Co.	dis 40 @ 5 @ 40 @ 10 \$	Coat and Hat, Sargent's List.	dis 55 @ 10 @ 10 \$	
Underhill's Haines and Bright goods.	dis 33¢ 40 \$	Coat and Hat, Reading.	dis 50 @ 10 @ 10 \$	
C. Hammond & Son.	dis 40 @ 10 @ 50 \$			
Peck's.	dis 40 @ 10 @ 40 @ 10 @ 25 \$			
Kelly's.	dis 50 @ 50 @ 25 \$			
Sargent & Co.	dis 50 \$			
Ten Eyck Edge Tool Co.	dis 40 @ 10 @ 40 @ 10 @ 25 \$			
Collins, following list.	dis 10 @ 25 \$			
Shingling, Nos. 1, 2, 3.	dis \$6.50 \$6.00 \$5.50			
Claw.	dis 6.00 6.00 7.00			
Lathing.	dis 5.50 6.00 6.50			
Hay Kates.				
Lightning.	Mfrs. price \$ per doz \$18			
Electric.	dis 25 \$ Jobber's Extras			
Wadsworth's.	dis \$18.50 30 @ 55 \$			
Carter's Needle.	dis \$11.50 @ \$12.00			
Heath's.	dis \$13.50 @ \$14.00			
Hinges.				
Wrought Iron Hinges.				
Strap and T.	dis 70 @ 10 @ 70 @ 10 @ 5 \$			
Screw Hook and T.	8, 10, 12 in. \$ 3.			
Strap.	14 to 36 in. \$ 3.			
Heavy Welded Hook.	14 in. & up. \$ 3.			
Screw Hook and Eye.	14 in. \$ 3.			
Rolled Blind Hinges.	Nos. 32 and 34.			
Rolled Blind Hinges.	Nos. 22 and 24.			
Rolled Plate.				
Rolled Raised.				
Plate Hinges.	8, 10 & 12 in. \$ 3.			
"Providence" over 12 in. \$ 3.				
Spring Hinges.				
Geer's Spring and Blank Butts.	dis 40 \$			
Union Spring Hinge Co.'s list, March, 1886.	dis 20 \$			
Acme and U. S.	dis 30 \$			
Empire and Crown.	dis 20 \$			
Hero and Moazor.	dis 50 \$			
American, Gem, and Star, Jappanned.	dis 20 \$			
American, Gem, and Star, Bronzed.	dis 20 \$			
Oxford, Bronze and Brass.	dis 20 \$			
Barker's Double Acting.	dis 20 @ 10 \$			
Union Mfg. Co.	dis 20 \$			
Bommer's.	dis 30 \$			
Buckman's.	dis 15 @ 20 \$			
Chicago.	dis 30 \$			
Gate Hinges.				
Western.	dis \$4.40, dis 60 \$			
N. E. Reversible.	dis \$7.00, dis 65 \$			
Clark's No. 12.	dis \$6.20, dis 55 @ 10 \$			
N. Y. State.	dis \$6.00, dis 55 @ 10 \$			
Automatic.	dis \$12.50, dis 50 \$			
Common Sense.	dis \$10.40, dis 50 \$			
Seymour's.	dis \$6 per doz, dis 50 \$			
Shepard's, Nos. 1, 2, 10 and 20.	dis \$6 @ 10 @ 60 @ 10 @ 25 \$			
Shepard's, No. 5.	dis 60 @ 10 @ 60 @ 10 @ 10 \$			
Reed's Latch and Hinges.	dis \$6 per set, \$12, dis 50 \$			
Bind Hinges.				
Parker.	dis 75¢ 5 \$			
Palmer.	dis 50 @ 10 \$			
Seymour.	dis 70¢ 2.			
Nicholson.	dis 45 @ 10 \$			
Huffer.	dis 50 \$			
Clark's, Nos. 1, 3, 5, 40 and 50.	dis 75 @ 10 @ 80 \$			
Clark's Mortise Gravity.	dis 50 \$			
Sargent's, Nos. 1, 3, 5, 11, 13.	dis 75 @ 10 @ 75 @ 10 @ 5 \$			
Sargent's, No. 12.	dis 75 @ 10 @ 10 \$			
Reading's Gravity.	dis 75 @ 10 @ 75 @ 10 @ 5 \$			
Shepard's "Notesless."	Nos. 50, 60, 65 & 55.			
Shepard's Niagara Gravity.	Nos. 1, 3 and 5.			
Shepard's Buffalo Gravity.	Nos. 1, 3 and 5.			
Shepard's Champion Gravity.	No. 75.			
Shepard's Steamboat Gravity.	dis \$6 @ 10 @ 5 \$			
Shepard's Acme Lull & Porter.	dis 75 @ 10 @ 75 @ 10 \$			
Shepard's O. S. Lull & Porter.	dis 75 @ 10 @ 75 @ 10 \$			
Shepard's "Queen City" Reversible.	dis 70 @ 10 @ 5 \$			
Clark's Lull & Porter.	Nos. 6, 1, 1½, 2, 2½.			
North's Automatic Blind Fixtures.	Nos. 2, for Wood.			
Wood, \$10.50. No. 3, for Brick.	\$13.50.			
Hose.	dis 25 @ 25 \$			
Hondled.				
Garden, Mortar, &c.	dis 65 @ 5 \$			
Planter's, Cotton, &c.	dis 65 @ 5 \$			
Warren Hoe.	dis 60 \$			
Magic.	dis 60 \$			
Hoos.				
D. & H. Scovil.	dis 15 \$			
Lane's Crescent Scovil Pattern.	dis 45 \$			
Lane's Crescent Planters Pattern.	dis 45 & 5 \$			
Lane's Razor Blade, Scovil Pattern.	dis 30 \$			
Maynard.	dis 45 @ 5 \$			
Saukay Tool Co.	dis 60 \$			
Hubbard & Co.	dis 60 \$			
Bare.	dis 60 \$			
Grub.	dis 60 @ 60 @ 10 \$			
Hog Rings and Ringers.				
Hill's Improved Ringers.	dis doz. \$6.50 @ 6.75			
Hill's Old Style Ringers.	dis doz. \$6.50 @ 6.00			
Hill's Rings.	dis doz. boxes \$2.00 @ 2.25			
Perfect Rings.	dis doz. boxes \$1.75 @ 2.00			
Perfect Ringers.	dis doz. boxes \$1.50 @ 2.00			
Blair's Hog Rings.	dis doz. \$6.00 @ 6.25			
Blair's Hog Ringers.	dis doz. \$6.00 @ 6.00			
Champion Ringers.	dis 60 \$			
Duplex (Wood Track).	dis 60 \$			
Terry's Patent.	dis doz. dr. 4 in. \$10. 5 in.			
812.	dis 50 @ 5 \$			
Cronk's Patent.	No. 4, \$12; No. 5, \$14.40; No. 6, \$18.60			
Wood Track Iron Clad.	dis 50 @ 10 @ 50 @ 15 \$			
Carrier Anti-Friction.	dis 50 @ 10 \$			
Architect.	dis 40 \$			
Eclipse.	dis 20 @ 20 \$			
Felix.	dis 30 @ 30 @ 10 \$			
Richards'.	dis 40 @ 40 @ 10 \$			
Lane's Steel Anti-Friction.	dis 40 @ 40 @ 10 \$			
The Ball Bearing Door Hanger.	dis 20 @ 10 @ 25 @ 10 \$			
Warner's Patent.	dis 20 @ 20 @ 10 \$			
Stearns' Anti-Friction.	dis 20 @ 20 @ 10 \$			
Stearns' Cha'tege.	dis 25 @ 10 @ 25 @ 10 @ 5 \$			
Faultless.	dis 40 @ 40 @ 10 \$			
American.	dis 40 @ 20 @ 10 \$			
Rider & Wooster, No. 1, \$24; No. 2, 75¢.	dis 40 @ 20 @ 10 \$			
Paragon, Nos. 1, 2 and 3.	dis 40 @ 10 \$			
Paragon, Nos. 5, 5½, 7 and 8.	dis 20 @ 10 \$			
Crescent.	dis 60 @ 60 @ 10 \$			
Nickel-Cast Iron.	dis 40 \$			
Nickel-Malleable Iron and Steel.	dis 40 \$			
Scranton Anti-Friction Single Strap.	dis 33¢ 40 \$			
Scranton Anti-Friction Double Strap.	dis 40 \$			
Universal Anti-Friction.	dis 40 \$			
Harvest Snaps. —See Snaps.				
Hatchets. —List Jan. 1, 1886.				
Isaiah Blood.	dis 35 @ 40 \$			
Hunt's Shingling Lath and Claw.	dis 40 @ 25 \$			
Hunt's Broad.	dis 40 \$			
Buffalo Hammer Co.	dis 40 @ 10 @ 50 \$			
Hurd's.	dis 40 @ 10 @ 50 \$			
Fayette R. Plumb.	dis 40 @ 10 @ 50 \$			
Wm. Mann, Jr. & Co.	dis 50 @ 50 @ 55 \$			
Underhill's Edge Tool Co.	dis 40 @ 5 @ 40 @ 10 \$			
Underhill's Haines and Bright goods.	dis 33¢ 40 \$			
C. Hammond & Son.	dis 40 @ 10 @ 50 \$			
Peck's.	dis 40 @ 10 @ 40 @ 10 @ 25 \$			
Kelly's.	dis 50 @ 50 @ 25 \$			
Sargent & Co.	dis 50 \$			
Lightning.	dis 10 @ 10 \$			
Collins, following list.				
Shingling, Nos. 1, 2, 3.	dis \$6.50 \$6.00 \$5.50			
Claw.	dis 6.00 6.00 7.00			
Lathing.	dis 5.50 6.00 6.50			
Hay Kates.				
Lightning.	Mfrs. price \$ per doz \$18			
Electric.	dis 25 \$ Jobber's Extras			
Wadsworth's.	dis \$18.50 30 @ 55 \$			
Carter's Needle.	dis \$11.50 @ \$12.00			
Heath's.	dis \$13.50 @ \$14.00			
Hinges.				
Wrought Iron Hinges.				
Strap and T.	dis 70 @ 10 @ 70 @ 10 @ 5 \$			
Screw Hook and T.	8, 10, 12 in. \$ 3.			
Strap.	14 to 36 in. \$ 3.			
Heavy Welded Hook.	14 in. & up. \$ 3.			
Screw Hook and Eye.	14 in. \$ 3.			
Heavy Nailed Hinges.				
Strap.	dis 25 @ 25 @ 25 \$			
Eye.	dis 30 @ 30 @ 30 \$			
Extra.	dis 30 @ 30 @ 30 \$			
N. Y. B. & P. Co. Para.	dis 30 @ 30 @ 30 \$			
N. Y. B. & P. Co. Extra.	dis 30 @ 30 @ 30 \$			
N. Y. B. & P. Co. Dundee.	dis 30 @ 10 @ 10 \$			
Ice Picks, Chisel, &c.				
Am. Ice Chisel Pol'd.	dis \$3.00, dis 25 @ 25 @ 25 \$			
National Ice Chisel.	dis \$2.50, dis 20 @ 20 \$			
Noves. Ice Breakers.	dis \$2.25, dis 20 @ 20 \$			
Dunlap's Ring Picks.	dis \$2.00, dis 15 @ 15 \$			
Wood Head Picks, Sargent's.	dis \$1.60, dis 50 @ 50 \$			
Iron Head Picks, Sargent's.	dis \$0.25, dis 50 @ 50 \$			
Ice Mallets, Pick in handle.	dis \$0.25, dis 15 @ 15 \$			
Ice Axes, Small Cast or Mall.	dis \$0.25, dis 25 @ 25 @ 25 \$			
Combination Ice Tools.	dis \$0.25, dis 20 @ 20 \$			
Acme Ice Pick and Tongue.	dis gross \$5.00, dis 50 @ 50 \$			
Roger's Lightning Ice Chisel.	dis gross \$28.50			
Ice Tongs.				
Champion, S. S. & Co.	dis \$4.00, dis 25 @ 25 @ 25 \$			
Family.	dis \$2.75, dis 2			

Syracuse Screw-Driver Bits.	dis 30 & 30 & 5	dis 50 & 50	dis 10
Screw Driver Bits.	dis 50 & 50	dis 10	dis 10
Screw Driver Bits, Parr's.	dis gro. 6.25		
Fray's Hot. Hdle. Sets, No. 3, \$12.	dis 25 @ 25 & 10	dis 50	dis 50
P. D. & Co.'s, all Steel.			
Screws			
Wood Screws—List, Brass, Jan. 27; Iron, July 1, 1887			
Flat Head Iron.	dis 70	dis 50	dis 50
Round Head Iron.	dis 65	Ex. 10 % often	dis 50
Flat Head Brass.	dis 65	given by	dis 50
Round Head Brass.	dis 60	Jobbers.	dis 50
Flat Head Bronze.	dis 65		dis 50
Round Head Bronze.	dis 60		dis 50
Machines			
Flat Head, Iron.	dis 55	dis 50	dis 50
Round Head, Iron.	dis 50		
Bench and Hand			
Bench, Iron.	dis 55 & 10 @ 55 & 10	dis 50 & 10	dis 50
Bench, Wood, Beech.	dis 52.25		
Bench, Wood, Hickory.	dis 20 & 10		
Hand, Wood.	dis 25 & 10 @ 25 & 10	dis 50 & 10	dis 50
Laz. Blunt Point.	dis 70		
Coach and Laz. Gimlet Point.	dis 65 @ 65 & 10	dis 50 & 10	dis 50
Bed.	dis 25 & 5		
Hand Rail, Sargent's.	dis 65 @ 65 & 10		
Hand Rail, Humason, Beckley & Co. s.	dis 70 & 10 @ 75		
Hand Rail, Am. Screw Co.	dis 75		
Jack Screws, Millers Falls list.	dis 50 @ 50		
Jack Screws, P. S. & W.	dis 35		
Jack Screws, Sargent.	dis 60 & 10 @ 60 & 10		
Jack Screws, Stevens'.	dis 40 @ 40 & 10		
Scroll Saws.			
Lester, complete, \$10.00.	dis 25		
Roxys, complete, \$4.00.	dis 25		
Scythe Smuths.	dis 50 & 10		
Shears.			
American (Cast) Iron.	dis 75 & 10 @ 75 & 10		
Pruning.	See Pruning Hooks and Shears		
Barnard's Lamp Trimmers.	dis 30		
Beymours' List, Dec. 1881 dis 60 & 10 & 10 @ 60 & 10 & 5			
Heinrich's List, Dec. 1881 dis 60 & 10 & 10 @ 60 & 10 & 5			
Heinrich's Tailors' Shears.	dis 35		
First quality C. S. Trimmers.	dis 80 & 80 @ 80		
Second quality C. S. Trimmers.	dis 80 & 10 @ 80 & 10		
Acme Cast Shears.	dis 10 & 10		
Diamond Cast Shears.	dis 10 & 10		
Victor Cast Shears.	dis 75 & 10 @ 75 & 10		
Howe Bros. & Hubert, Solid Forged Steel.	dis 40		
Cleveland Machine Co., Solid Steel Forged.	dis 70		
Sheaves.			
Sliding Door.			
M. W. & Co., list Jan. 1, 1887.	dis 50 & 10 @ 60 & 5		
R. & E. list, Dec. 18, 1886.	dis 55 & 2		
Corbin's list.	dis 60 & 10 & 2		
Patent Roller.	dis 60 & 10 & 2		
Patent Roller, Hatfield's.	dis 75		
Russell's Anti-Friction, list Dec. 18, 1885.	dis 60 & 2		
Moore's Anti-Friction.	dis 60		
Sliding Shutter.			
R. & E. list Dec. 18, 1885.	dis 60 & 10 & 2		
Sargent's list.	dis 60 & 10		
Reading list.	dis 60 & 10 & 2		
Ship Tools.			
L. & J. White.	dis 20 & 5		
Albertson Mfg. Co.	dis 25		
Shees, Horse, Mule, &c.			
Horse—			
Burden's, Perkins', Phoenix, at factory.	\$4.00		
Mule—Add \$1 to 2 kg to above prices.			
Oz. Wrought			
Ton lots.	dis 9		
1000 lb. lots.	dis 9		
500 lb. lots.	dis 10		
Shot. —(Eastern prices, 2¢ off, cash, 5 days.)			
Drop, 4 bag, 26 lb.	\$1.50		
Drop, 4 bag, 5 lb.	35		
Buck and Chilled, 4 bag.	\$1.75		
Buck and Chilled, 5 lb. bag.	40		
Shovels and Spades.			
Amer' Shovels, Spades, &c. list Nov. 1, 1885.	dis 20		
NOTE.—Jobbers frequently give 5 @ 7½% extra on above.			
Griffith's Black Iron.	dis 50 & 10		
Griffith's C. S.	dis 60 @ 60 & 10		
Griffith's Solid Cast Steel R. R. Goods.	dis 20		
Old Colony (Sanford Fork & Tool Co.).	dis 20		
St. Louis Shovel Co.	dis 15 @ 15 & 7½		
Hussey, Bians & Co.	dis 15 @ 25		
Hubbard & Co.	dis 20 & 20 @ 7½		
Lehigh Mfg. Co.	dis 60 & 10		
Payne Pettebone & Son, list January, 1886.	dis 30		
Remington's (Lowman's) Patent.	dis 30 & 10 @ 40		
Rowland's Black Iron.	dis 60 & 10		
Rowland's Steel.	dis 60 & 5 @ 60 & 10		
Sheve and Tongs.			
Iron Head.	dis 60 & 10 @ 60 & 10		
Brass Head.	dis 60 & 10 & 10		
Skele, Thimble.			
Western list.	dis 75 & 5 @ 75 & 10		
Columbus Wrt. Steel, list Nov. 1, 1887.	dis 20		
Coldbrookdale Iron Co.	dis 50 & 10		
Steves.			
Buffalo Metallic, S. S. & Co., new list.	dis 50 & 25 @ 10		
Barier Flour Sifters.	dis 20		
Smith's Adjustable Sifters.	dis 20		
Smith's Adjustable Milk Strainer.	dis 20		
Smith's Adjustable F. & C. Strainer.	dis 20		
Sieves, Wooden Rim—	Iron, Plated.		
Mesh 18, Nested.	70¢	90¢	
Mesh 20, Nested.	85¢	1.00	
Mesh 24, Nested.	1.00	1.10	
Stiles. —School, by case.	dis 50 & 10		
Snaps, Harness, &c.			
Anchor (T. & S. Mfg. Co.).	dis 60		
Fitch's (Bristol).	dis 50 & 10		
Hotchkiss.	dis 10		
Andrews.	dis 50		
Sargent's Patent Guarded.	dis 70 & 10 @ 70		
German, new list.	dis 40 & 10		
Covert.	dis 50 & 2		
Covert, New Patent.	dis 50 & 50		
Covert, New R. E.	dis 60 & 5		
Covered Spring.	dis 60 & 10 & 10		
Soldering Irons.			
Court's Adjustable, list Jan. 1, 1886.	dis 35 & 5		
Spoke Shaves. —Iron.	dis 45		
Wood.	dis 30		
Bailey's (Stanley R. & L. Co.).	dis 40 & 10		
Stearns'.	dis 20 & 10 @ 30		
Spoke Trimmers.			
Bonney's.	dis \$10.00, dis 50		
Stearns'.	dis 20 & 10		
Ives'.	dis 1.00, \$12.00.	dis 55 & 2	
Douglas'.	dis \$8.00, dis 20		
Spoons and Forks.			
Tinned Iron.			
Basting, Central Stamping Co.'s list.	dis 70 @ 70 & 10		
Solid Table and Tea, Central Stamping Company's list.	dis 70 @ 70 & 10		
Buffalo, S. S. & Co.	dis 33 & 2		
Silver-Plated. —4 mos. or 5 % cash 30 days.			
Meriden Brit. Co., Rogers.	dis 50		
C. Rogers & Bros.	dis 50		
Rogers & Bro.	dis 50		
Reed & Barton.	dis 50		
Wm. Rogers Mfg. Co.	dis 50 @ 50 & 10		
Simpson, Hall, Miller & Co.	dis 50 @ 50 & 10		
Holmes & Edward's Silver Co.	dis 50 @ 50 & 10		
H. & E. Silver Co. Mexican Silver.	dis 50 @ 50 & 5		
H. & E. Silver Co., Durham Silver.	dis 50 @ 50 & 5		
German Silver.	dis 50 @ 50 & 5		
German Silver, Hall & Elton.	dis 50 @ 50 & 5		
Nickel Silver.	dis 50 & 5 @ 50 & 10 & 5		
Reece's New Screw Plates.	dis 33 1/2 @ 33 1/2		
Stone.			
Hindostan No. 1, 3¢; Axe, 5¢; Slips No. 1, 5¢.			
Sand Stone.	dis 20		
Washto Stone, Extra.	dis 20		
Washto Stone, No. 1.	dis 15 @ 15		
Washto Stone, No. 2.	dis 11 @ 12		
Washto Stone, No. 1, Extra.	dis 40 @ 42		
Washita Slips, No. 1.	dis 30 @ 32		
Arkansas Stone, No. 1, 4 to 6 in.	dis 35		
Arkansas Stone, No. 1, 6 to 9 in.	dis 75		
Turkey Oil Stone.	dis 4 to 5 in.		
Laure Superior, Chase.	dis 16		
Laure Superior, Slips, Chase.	dis 32		
Seneca Stone, Red Paper Brand.	dis 20		
Seneca Stone, High Rounds.	dis 20		
Seneca Stone, Small Wheats.	dis 20		
Steve Polish.			
Joseph Dixon.	dis gro. \$6.00, dis 10		
Gem.	dis gro. \$4.50, dis 10		
Gold Medal.	dis gro. \$6.00, dis 25		
"Mirror".	dis gro. \$6.00, dis 25		
Lustro.	dis gro. \$4.75 net		
Ruby.	dis gro. \$3.75 net		
Rising Sun, 5 gro. lots.	dis gro. \$5.50		
Diamond's Plumbeo.	dis 50		
Boynton's Noon Day.	dis gro.		
Parlor's Pride Stove Enamel.	dis 1.00 @ 1.50		
Yates' Liquid, 1 1/2 lb.	dis 50		
Yates Standard Paste Polish, 10-lb cans, per lb.	15		
Jet Black.	dis gro. \$3.50		
Japanese.	dis gro. \$3.50		
Fire-side.	dis gro. \$2.50		
Diamond O. K. Enamel.	dis gro. \$19.00		
Tacks, Brads, &c.			
List, Jan. 2, 1888.			
American Iron Carpet Tacks.	dis 72 1/2 @ 10 & 2		
Steel Carpet Tacks.	dis 72 1/2 @ 10 & 2		
Swedes from Carpet Tacks.	dis 72 1/2 @ 10 & 2		
American Iron Cut Tacks.	dis 70 & 10 & 2		
Swedes Iron Cut Tacks.	dis 67 1/2 @ 10 & 2		
Swedes Iron Unsharpeners' Tacks.	dis 67 1/2 @ 10 & 2		
Tinned Swedes Iron Tacks.	dis 67 1/2 @ 10 & 2		
Tin Swedes Iron Uphol'ers' Tacks.	dis 67 1/2 @ 10 & 2		
Gimp and Lace Tacks.	dis 67 1/2 @ 10 & 2		
Tinned Gimp and Lace Tacks.	dis 67 1/2 @ 10 & 2		
Swedes Iron Trimmers' Tacks.	dis 67 1/2 @ 10 & 2		
Swedes Iron Miners' Tacks.	dis 67 1/2 @ 10 & 2		
Swedes Iron Bill Posters' or Railroad Tacks.	dis 67 1/2 @ 10 & 2		
Swedes Steel Tacks, all kinds (Swedes Iron price list).	dis 67 1/2 @ 10 & 2		
Copper Tacks.	dis 22 1/2 @ 10 & 2		
Copper Finishing Trunk and Clout Nails.	dis 33 1/2 @ 10 & 2		
Finishing Nails.	dis 33 1/2 @ 10 & 2		
Trunk and Clout Nails.	dis 60 & 10 & 2		
Tinned Trunk and Clout Nails.	dis 60 & 10 & 2		
Basket Nails.	dis 60 & 10 & 2		
Common and Patent Brads.	dis 60 & 10 & 2		
Hungarian Nails.	dis 60 & 10 & 2		
Chair Nails.	dis 60 & 10 & 2		
Zinc Glaizers' Points.	dis 60 & 10 & 2		
Cigar Box Nails.	dis 45 & 10 & 2		
Picture-Frame Points.	dis 45 & 10 & 2		
Looking-Glass Tacks.	dis 45 & 10 & 2		
Leathered Carpet Tacks.	dis 45 & 10 & 2		
Brush Tacks.	dis 45 & 10 & 2		
Brush Fixtures.	dis 30 & 10 @ 10 & 2		
Lining and Sadou Nails, List Jan. 1, 1888.	dis 30 & 10 @ 10 & 2		
Silvered.	dis 30 & 10 @ 10 & 2		
Japaned.	dis 20 & 10 @ 10 & 2		
Double-pointed Tacks.	dis 35		
Wire Carpet Nails.	dis 50 & 10		
Wire Brads and Nails.	See Nails, Wire		
Steel Wire Brads, R. & E. Mfg. Co.'s list.			
Tap Borers.			
Common and Ring.	dis 20 & 10		
Ives' Tap Borers.	dis 33 1/2 @ 35		
Enterprise Mfg. Co.	dis 20 & 10		
Clark's.	dis 33 1/2 @ 35		
Tapes, Measuring. —American.	dis 25 & 10		
Spring.	dis 40 & 10		
Chesterman's.	dis 25 & 10 @ 25		
Regular list dis 25 @ 25			
Thermometers.—Tin Case.	dis 80 @ 80 & 10		
Thimble Skeins.	See Skeins.		
Ties, Bale.			
Steel Wire, Standard list.	dis 50 & 10 & 5		
Shears and Snips (P. S. & W.).	dis 20 @ 25		
Punches.	See Punches.		
Snips, J. Mallinson & Co.	dis 33 1/2		
Tinware.			
Stamped, Japanned & Pieced, list Jan. 20, 1887.			
Tobacco Cutters.			
Enterprise Mfg. Co. (Champion).	dis 20 & 10 @ 25		
Wood Bottom.	dis \$5.00 @ 5.25		
All Iron.	dis 40 & 25		
Joshua Lock Co.'s.	dis \$18.00, dis 50 @ 55		
Wilson's.	dis 20 @ 24, dis 50 & 10 @ 25		
Clipper (Sargent & Co.).	dis 50 & 10 @ 25		
Covert.	dis \$20.00, dis 40 & 10		
Excelsior.	dis 50 & 10 @ 25		
Shaw's.	dis 50 & 10 @ 25		
Payson's Universal.	dis 40 @ 40 & 10		
Crown and Star.	dis 50 & 10 @ 25		
Traps.			
Game—			
Newhouse.	dis 35 @ 40 & 5		
Oneida Pattern.	dis 60 & 10 & 10 @ 70		

CURRENT METAL PRICES.

MAY 9, 1888.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
2 to 2 in. round and square...	1 lb. 2.00 @ 2.10¢
1 to 6 in. x 3/8 to 1 in.	1 lb. 2.00 @ 2.10¢
Refined Iron:	
3/8 to 2 in. round and square...	1 lb. 2.20 @ 2.30¢
4/8 to 6 in. x 3/8 to 1 in.	1 lb. 2.40 @ 2.50¢
1 to 6 in. x 1/4 and 5/16...	1 lb. 2.30 @ 2.40¢
Rods—3/8 and 11/16 round and sq.	1 lb. 2.40 @ 2.50¢
Bands—1 to 8 in. x 3/16 to No. 12.	1 lb. 2.40 @ 2.50¢
Burden Best Iron, base price.	1 lb. 3.00 @ 3.00¢
Burden's "H. B. & S." Iron, base price.	1 lb. 2.80 @ 2.80¢
"Ulster"	1 lb. 3.10 @ 3.10¢
Norway Rods	4.00 @ 5.00¢

Merchant Steel from Store.

Per pound.	
Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots.	24¢ @ 24¢
Best Cast Steel, base price in small lots.	54¢ @ 54¢
Best Cast Steel Machinery, base price in small lots.	54¢ @ 54¢

Extras on Merchant Steel.

For classification and extras adopted by the Merchant Steel Association of the United States January 11, 1888, see *The Iron Age*, Feb. 23, 1888.

Sheet Iron from Store.

Common American. R. G. Cleanned.	
10 to 16.	1 lb. 2.75 @ 2.80¢
17 to 20.	1 lb. 2.85 @ 3.00¢
21 to 24.	1 lb. 3.00 @ 3.10¢
25 and 26.	1 lb. 3.20 @ 3.25¢
27.	1 lb. 3.75 @ 3.75¢
28.	1 lb. 3.50 @ 4.00¢
Galvanized, 14 to 20.	1 lb. 4.80 @ 4.50¢
Galvanized, 21 to 24.	1 lb. 5.00 @ 4.87 1/2¢
Galvanized, 25 to 26.	1 lb. 5.60 @ 5.25¢
Galvanized, 27.	1 lb. 6.00 @ 5.62 1/2¢
Patent Planished.	1 lb. 6.40 @ 6.00¢
Russia.	1 lb. 9.4¢ @ 10¢
American Cold Rolled B. B.	1 lb. 5¢ @ 7¢

English Steel from Store.

Best Cast.	1 lb. 15¢
Extra Cast.	1 lb. 16¢ @ 17¢
Swaged, Cast.	1 lb. 16¢
Best Double Shear.	1 lb. 15¢
Blister, 1st quality.	1 lb. 12 1/2¢
German Steel, Best.	1 lb. 9¢
2d quality.	1 lb. 8¢
3d quality.	1 lb. 7¢
Sheaf Cast Steel, 1st quality.	1 lb. 15¢
2d quality.	1 lb. 14¢
3d quality.	1 lb. 12 1/2¢

METALS.

Tin.	Per lb.
Banca, Pigs.	34¢
Straits, Pigs.	28 @ 30¢
English, Pigs.	28 @ 30¢
Straits in Bars.	34¢

Tin Plates.

Charcoal Plates.—Bright. Melyn Grade.	Per box.
IC, 10 x 14.	\$6.50
IC, 12 x 12.	6.75
IC, 14 x 20.	6.50
IC, 20 x 28.	13.00
IX, 10 x 14.	8.00
IX, 12 x 12.	8.25
IX, 14 x 20.	8.00
IX, 20 x 28.	16.00
DC, 12 1/2 x 17.	6.00
DX, 12 1/2 x 17.	7.50
Calland Grade.	10.10
IC, 12 x 12.	6.25
IC, 14 x 20.	6.00
IX, 10 x 14.	7.50
IX, 12 x 12.	7.75
IX, 14 x 20.	7.50
DC, 12 1/2 x 17.	5.00 @ 5.25
DX, 12 1/2 x 17.	6.00 @ 6.25
Allaway Grade.	35.25 @ 5.50
IC, 12 x 12.	5.50 @ 5.75
IC, 14 x 20.	5.25 @ 5.50
IC, 20 x 28.	10.75 @ 11.00
IX, 10 x 14.	6.35 @ 6.50
IX, 12 x 12.	6.50 @ 6.75
IX, 14 x 20.	6.25 @ 6.50
IX, 20 x 28.	12.75
DC, 12 1/2 x 17.	5.00 @ 5.25
DX, 12 1/2 x 17.	6.00 @ 6.25
Coke Plates.—Bright. Steel Coke.—IC, 10 x 14, 14 x 20.	\$4.90 @ \$5.10
10 x 20.	7.50 @ 8.00
20 x 28.	10.00 @ 10.25
IX, 10 x 14, 14 x 20.	4.00 @ 5.00
BV Grade.—IC, 10 x 14, 14 x 20.	6.00
Charcoal Plates.—Terne. Dean Grade.—IC, 14 x 20.	\$4.67 1/2 @ \$4.75
20 x 28.	9.25 @ 9.50
IX, 14 x 20.	5.67 1/2 @ 5.75
20 x 28.	11.37 1/2 @ 11.50
Abecarne Grade.—IC, 14 x 20.	4.50 @ 4.65
20 x 28.	9.00 @ 9.25
IX, 14 x 20.	5.50 @ 5.75
20 x 28.	11.00

Tin Boiler Plates.

IX, 14 x 26.	112 sheets.	\$12.50 @ \$12.75
IX, 14 x 28.	112 sheets.	13.75 @ 13.00
IX, 14 x 31.	112 sheets.	14.25 @ 14.50

Copper.

DUTY: Pig, Bar and Ingots, 4¢; Old Copper, 3¢. Manufactured (including all articles of which Copper is a component of chief value), 45¢ ad valorem.

Lake.	17¢ @ 17.50¢
"Anchor" Brand.	16.50¢ @ 17¢

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887.

Not wider than	Weights per square foot and prices per pound.							
	Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30—72	25	25	25	26	26	26	21	33
30—72	25	25	25	26	26	26	34	36
36—96	25	25	25	26	26	26	34	36
36—96	25	25	25	27	27	27	34	38
48—96	25	25	25	26	26	26	34	38
48—96	25	25	25	26	26	26	34	38
60—96	25	25	25	26	26	26	34	38
84—96	26	27	—	—	—	—	—	—
84—96	26	27	—	—	—	—	—	—
Over 84 in. wide	28	30	—	—	—	—	—	—

All Bath Tub Sheets. 16 oz. 14 oz. 12 oz. 10 oz.

Per pound. \$0.28 0.30 0.32 0.35

Bolt Copper, 3/8 inch diameter and over, per pound. 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

Per pound.	
14 ounces to square foot and heavier.	28¢
12 ounce and up to 14 ounce to square foot.	29¢
10 ounce and up to 12 ounce.	31¢
Circles less than 8 inches diameter 2 cents per pound additional.	
Circles over 18 inches diameter are not classed as Copper Bottoms.	

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each.	8¢
Tinning sheets on one side, 30 x 60 each.	30¢
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each.	15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 54 in.), each.	12¢
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each.	12¢
Tinning sheets on one side, other sizes, per square foot.	24¢
For tinning both sides double the above prices.	

Planished Copper List. net.

Planished Copper List.	net.
For tinning both sides double the above prices.	

Tin Plates.

Seamless Copper.

Seamless Brass.

Brass and Copper Tubes.

Brass Pump Valves.

Brass Steam Cocks.

Brass Service, Meter and Union Meter Cocks.

Brass Swing Joints and Expansion Joints.

Brass Test Pumps.

Brass Steam Fittings, Rough.

Brass Steam Fittings, Finished.

Brass Union Joints.

Brass Soldering Unions and Nipples.

Brass Hose Fittings, Fusible and Boiler Plugs.

Iron Body Globe, Angie, Cross and Check Valves.

Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves.

Iron Cocks, all Iron.

All Iron Valves.

Corporation Cocks.

Corporation Cocks, "Mueller" Pattern, from Western list.

Ground Basin and Shampooing Cocks.

Compression Basin Cocks.

Compression Basin and Sink Cocks.

Compression Pantry Cocks.

Compression Double Basin and Shampooing Cocks.

Compression Bibbs, Urinal Cocks, Sill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks.

Basin Plugs and Basin Grates.

Bath and Wash Tray Plugs.

Bath Wastes, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets.

Basin Clamps, Basin Joints and Strainers.

Boiler Couplings, Ground Face, per set \$1.25.

Boiler Couplings, Plain Face, per set \$1.20.

Water Back Valve and Plain Couplings, Soldering Nipples and Unions.

Union Joints.

Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides.

Hose Goods.

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.